This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

W 26.

WAR DEPARTMENT, - - ADJUTANT GENERAL'S OFFICE.
(MILITARY INFORMATION DIVISION.)

No. XXXVI.

MAJOR GENERAL HENRY C. CORBIN,
ADJUTANT GENERAL, U. S. ARMY.
LIEUT. COLONEL W. A. SIMPSON, A. A. G.,
IN CHARGE OF DIVISION.

NOTES OF MILITARY INTEREST

FOR 1901.

COMPILED AND ARRANGED BY
CAPT. E. A. EDWARDS, 25TH INFANTRY;
CAPT. J. S. HERRON, 2D CAVALRY;
FIRST LIEUT. H. B. FERGUSON, CORPS OF ENGINEERS;
AND
SECOND LIEUT. R. S. CLARK, 9TH INFANTRY.

JANUARY, 1902.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1902.

WAR DEPARTMENT,

ADJUTANT GENERAL'S OFFICE.

Document No. 163.

M. I. D.

266910

TABLE OF CONTENTS.

	Page.
I.—BUDGETS	5
II.—ORGANIZATION	55
III.—FIELD ARTILLERY	81
IV.—MACHINE GUNS	119
V.—SMALL-CALIBER RIFLES	155
VI.—AUTOMATIC PISTOLS	171
VII.—EXPLOSIVES	185
VIII.—AMMUNITION SUPPLY	197
IX.—MECHANICAL TRANSPORTATION	219
X.—CARRIER PIGEONS	231
XI.—MISCELLANEOUS NOTES	243
XII.—MANEUVERS	299
XIII.—BIBLIOGRAPHY	489
INDEX	513

NOTES OF MILITARY INTEREST FOR 1901.

I.—BUDGETS.

AUSTRIA-HUNGARY.

MILITARY BUDGET FOR 1902.

[Reported by Capt. Floyd W. Harris, Fourth Cavalry, United States Military Attaché at Vienna.]

Ordinary expenditures for 1902 compared with those for 1901.

		1902.	1901.	Increase.	Decrease.
		*Crowns.**	*Crowns.**	*Crowns.**	*Crowns.**
Central administration		1,004,919	974,683	30,236	----------
Territorial and local headquarters and officers in local positions		3,420,240	3,406,175	14,065	----------
Intendence and auditing department		2,560,035	2,532,530	27,505	----------
Chaplain service		480,345	390,166	90,179	----------
Administration of military justice		792,894	770,265	22,629	----------
Superior headquarters and staffs		4,935,470	4,934,526	944	----------
Pay and allowance of troops:					
Infantry	33,794,396				
Rifles	3,630,149				
Cavalry	9,573,984				
Field artillery	6,982,496				
Fortress artillery	1,762,746				
Pioneers	2,148,626				
Railway and telegraph regiment	429,096				
Train	1,363,515				
Other expenditures on troops, such as schools, drills, transportation, etc	8,331,038				
		68,016,046	67,971,994	44,052	----------
Military educational institutions		3,830,380	3,824,884	5,496	----------
Military technical board		202,436	201,738	698	----------
Subsistence stores		1,321,539	1,558,542	----------	237,003
Bedding stores		94,910	94,910	----------	----------
Establishments of the clothing administration		382,424	375,558	6,866	----------
Ordnance department		9,551,043	9,405,757	145,286	----------
Depots of train material		197,899	197,881	18	----------
Depots of pioneer material		327,899	298,252	29,647	----------
Bureaus of military construction		9,366,947	8,720,804	646,143	----------
Military geographical institute		426,426	546,426	----------	120,000
Medical service		8,742,852	8,731,740	11,112	----------
Pensions		25,002,646	25,003,402	----------	756
Military prisons		204,340	206,796	----------	2,456
Miscellaneous expenditures		1,053,429	1,053,429	----------	----------
Subsistence in kind		38,637,406	38,375,584	261,822	----------
Rationing of troops		39,701,656	39,548,238	153,418	----------
Clothing and bedding		19,125,423	19,055,474	69,949	----------
Quarters		30,009,373	28,731,640	1,277,733	----------
Remounts		6,495,456	6,418,559	76,897	----------
Rewards to noncommissioned officers		5,520,000	5,320,000	200,000	----------
Total		281,404,433	278,649,953	2,754,480	----------

* One crown equals $0.203.

Extraordinary expenditures for 1902.

	Crowns.
Army:	
Replenishment of war stores	7,650,060
Buildings, quarters, and drill grounds	7,549,400
Temporary extraordinary demands	4,555,555
Extraordinary expenditures for carrying out changes in organization	264,088
Total	20,019,103
Headquarters, troops, and establishments of the territory of occupation:	
Pay and subsistence of troops, purchase of horses, armament, train, engineering and construction, equipment, medical service, etc	7,447,000

Comparative table of the bugetary strength for 1902 and 1901.

Branch of the service.	1902.		1901.	
	Officers.	Enlisted men.	Officers.	Enlisted men.
Central administration (war ministry, etc.)	201	61	199	61
Territorial and local headquarters, and officers in local positions	980	1,052	991	1,064
Intendencies and auditing department	840		840	
Chaplain service	149	146	120	117
Administration on military justice	205	288	205	260
Superior headquarters and staffs	871	849	871	847
Infantry:				
1 company bodyguard	4	129	4	129
102 regiments of the line	8,816	161,009	8,816	161,009
Rifles, 42 battalions	974	16,491	974	16,491
Cavalry:				
1 squadron bodyguard	4	132	4	132
42 regiments (15 dragoon, 16 hussar, and 11 uhlan)	1,764	45,726	1,764	45,726
Artillery:				
56 regiments field artillery, 16 batteries horse artillery and 3 batteries mountain artillery	1,589	25,502	1,589	25,502
6 regiments and 3 battalions of fortress artillery	398	7,762	398	7,762
Pioneers, 15 battalions	480	8,430	480	8,430
Railway and telegraph regiment, 3 battalions	86	1,487	86	1,487
Train, 8 squadrons	426	3,390	417	3,309
Officers and men permanently detailed and not available for duty with troops	372	687	372	687
One-year volunteer surgeons and veterinary surgeons		45		45
Firing schools of troops, aëronautic establishments, remount depots, etc	44	349	44	349
Military educational institutions	138	2,609	146	2,604
Military technical board	18	120	18	126
Subsistence stores	399	1,007	399	1,007
Bedding stores	15	88	15	88
Establishments of the clothing administration	110	495	108	494
Ordnance department ("technical artillery")	288	1,396	288	1,396
Depots of train material	9	86	9	86
Depots of pioneer material	14	170	13	171
Bureaus of military constructions	399	345	396	314
Military geographical institute	172	122	172	122
Medical service	1,430	4,141	1,429	4,140
Administration of soldiers' homes	7	24	7	24
Military prisons	95	30	96	31
Miscellaneous (military attachés)	8		8	
Total active list	21,305	284,168	21,278	284,010
Inmates in soldiers' homes		749		759
Pupils in military schools (boys and girls)		6,405		406,5

Composition of the general staff.

Feldzeugmeister	1
Lieutenant field marshals	2
Major generals	2
Colonels	33
Lieutenant colonels	50
Majors	63
Captains	164
Officers attached to the general staff	157
Officers detailed from the army and the retired list—Ruhestand—(2 majors, 30 captains)	32
Accountants and register officials	2
Armeediener	8
Enlisted men	635

BELGIUM.

Military budget for the fiscal year 1902.

Branch of the service.	Amounts asked for 1902.	Amounts appropriated for 1901.
ORDINARY EXPENDITURE.	*Francs.**	*Francs.**
Central administration	530,600.00	517,700.00
Pay and allowances	24,569,380.64	24,494,888.14
Hospitals and military pharmacies	910,335.00	849,135.00
Institutions of higher instruction	214,975.00	214,975.00
Ordnance department	1,889,944.05	1,889,944.05
Engineering material	1,585,000.00	1,574,125.00
Bread, meat, forage, and other allowances	18,602,332.35	18,771,599.85
Various money allowances and fees	427,754.68	427,754.68
Pensions and relief	407,100.00	407,100.00
Unforeseen expenses	67,949.00	58,149.00
EXTRAORDINARY EXPENDITURE.		
Various services	6,000,000.00	6,133,945.00
Total	55,205,370.72	55,339,315.72

* One franc equals $0.193.

Effective strength.

Arms of the service.	Officers.	Men.
General staff	79	
Provincial and garrison staffs	39	
Intendency	39	
Medical officers at hospitals	95	
Infantry (19 regiments*)	1,921	27,788
Cavalry (8 regiments*)	370	5,770
Artillery (8 regiments, 4 special companies*)	633	8,682
Engineers (1 regiment, 1 battalion, 5 special companies*)	152	1,703
Administrative battalion	78	963
Total	3,406	44,906

* In 1902, taken from Statesman's Year-Book, 1902.

Composition of the general staff.

Active section:	
Lieutenant generals	9
Major generals	18
Reserve section:	
Lieutenant generals	2
Major generals	4
Staff corps:	
Colonels	5
Lieutenant colonels	5
Majors	10
First captains	16
Second captains	10
Total	79

DENMARK.

Military budget for 1902.

[REPORTED BY LIEUT. COL. W. R. LIVERMORE, CORPS OF ENGINEERS, UNITED STATES MILITARY ATTACHÉ AT COPENHAGEN AND STOCKHOLM.]

Branch of the service.	Crowns.*
War office	93,558.38
Pay	5,384,040.39
Rations	312,198.78
Medical service	162,251.20
Uniforms	585,157.25
Quarters	369,002.00
Schools	184,476.91
Horses	1,073,286.93
Camps	173,970.25
Miscellaneous	199,351.00
War material	937,400.00
Fortifications	520,678.00
Bornholm militia	27,662.00
Unforeseen expenses	39,400.00
Topographical department of the general staff	114,010.00
Expenses for special occasions	34,862.79
Militia in Copenhagen	15,064.00
Total	10,226,369.88

*One crown equals $0.268.

Effective strength.

Branch of the service.	In peace.			In war.	
	Officers.	Noncommissioned officers.	Men.	Officers.	Noncommissioned officers and men.
Higher staffs	50	25	----------	65	34
Engineers	50	80	270	60	1,700
Field artillery	160	370	324	76	3,300
Fortification	----------	----------	975	120	3,200
Cavalry	90	167	480	92	2,400
Infantry	450	1,170	5,072	920	45,100
Reserve in Copenhagen	14	11	----------	80	3,000
Reserve in Bornholm	10	1	----------	35	1,400
Total	824	1,824	7,121	1,448	60,134

And 128 guns.

COMPOSITION OF THE ARMY OF DENMARK, 1901.

General staff.

Engineers:

1 regiment with 9 companies (in war 11 companies).

Artillery:

2 regiments of field artillery, each with 2 divisions, each division with 3 batteries of the line and 1 of the reserve. (War strength of a battery to be 4 officers, 200 men, 200 horses, and 8 guns.)

1 regiment of fortification artillery with 3 battalions; each battalion with 4 companies of the line and 2 of the reserve.

Cavalry:

5 regiments, each with 3 squadrons.

1 school squadron, which is to serve as a depot in time of war. (War strength of a squadron is 5 officers, 150 men, 180 horses.)

Infantry:

5 brigades, each with 2 regiments; each regiment with 3 line battalions and 1 reserve battalion (2d levy); each battalion with 4 companies. (The war strength of a line battalion is 21 officers and 1,050 men.)

The Guard, consisting of 1 line battalion and 1 reserve battalion.

Reserve corps:

In Copenhagen: 2 battalions of infantry and 2 companies of artillery.

In Bornholm: 1 battalion of infantry, 1 squadron of cavalry, and 2 companies of artillery.

The general staff in Denmark consists of:

1 major general as chief.

4 colonels or lieutenant colonels (for the present, 2 of each).

8 captains.

12 first lieutenants.

These officers can be of any arm of the service.

Under the staff is a railway board and a telegraph board.

The railway board consists of 5 officers (4 from the general staff and 1 engineer officer) and 2 civilian members.

The telegraph board consists of 7 officers (2 from the general staff, 2 engineer officers and 3 naval officers) and 2 civilian members.

To the general staff are furthermore assigned:

1 intendant.

1 chief surgeon.

1 surgeon.

1 depot quartermaster for the topographical department.

FRANCE.

MILITARY BUDGET FOR 1901.

[FROM REPORT OF CAPTAIN T. BENTLEY MOTT, ARTILLERY CORPS, UNITED STATES MILITARY ATTACHÉ AT PARIS.]

The law of February 25, 1901, fixed the ordinary expenditures at 632,400,171 francs, or 9,929,390 francs more than were called for in the estimates, which were 622,470,781 francs for the ordinary expenditures as against 633,093,750 francs appropriated in 1900, and 71,143,750 francs for the extraordinary expenditures as against 26,143,750 francs appropriated in 1900. The net increase in the amount demanded in 1901 over the amount appropriated in 1900 is thus 34,377,031 francs. The following table shows in detail the original estimates for 1901:

Ordinary expenditures.

	Home.	Algeria.	Tunis.	Total.
	Francs.	*Francs.*	*Francs.*	*Francs.*
Salary of war minister and personnel of central administration	2,439,840			2,439,840
Officers detailed to central administration	1,376,820			1,376,820
Expenses for material of central administration	261,100			261,100
Printing	562,352			562,352
Geographical service	789,950	119,000		908,950
General staff (archives, library, and historical museum)	152,800			152,800
Military telegraphy	475,500	33,000	11,400	519,900
Department of military railroads (material)	154,000	900	100	155,000
General staff and staff service	10,133,695	706,325	193,709	11,033,729
Various departments and special staffs (personnel of controle service, intendance department, and artillery and engineer staffs)	12,229,644	1,128,444	336,412	13,694,500
Military schools, personnel	9,002,203			9,002,203
Military schools, material	3,246,120			3,246,120
Personnel hors cadre and not classed in troop units	7,634,123	2,375,865	503,364	10,513,352
Pay of infantry	98,576,874	11,388,904	3,264,016	113,229,794
Pay of administrative troops	3,498,127	794,183	113,900	4,406,210
Pay of cavalry	23,581,331	4,149,476	718,817	28,449,624
Pay of artillery	27,570,191	609,105	404,614	28,583,910
Pay of engineers	4,162,366	240,974	94,199	4,497,539
Pay of train	2,955,758	496,170	171,117	3,623,045
Departmental and African gendarmerie	33,383,023			33,383,023
Republican guard	4,711,947			4,711,947
Provisions	33,564,240	4,628,057	1,447,371	39,639,668
Meat (fresh, canned, and salted)	53,026,900	4,567,383	1,690,069	59,284,352
Forage	63,954,365	5,418,204	1,601,744	70,974,313
Medical service	7,300,528	1,368,517	288,144	8,957,189
Department of military convoys	1,741,500	1,112,500	333,500	3,187,500
Travel allowances and special journeys	9,645,934	957,280	151,800	10,755,014
Clothing and camp equipage	48,870,841	4,739,050	1,529,947	55,139,838
Military bedding	10,327,374	1,065,336	253,140	11,645,850
Special transportation	592,900	500,000	97,000	1,189,900
Recruiting	395,910			395,910
Reserve and territorial army	272,500	5,520	1,270	279,290
Military justice and prisons	986,990	148,105	16,840	1,151,935
Workhouses and military penitentiaries	75,990	72,780		148,770
General remount service	14,835,400	1,168,775	341,000	16,345,175
Census of horses and mules	88,500	5,000		93,500
Horse equipment	5,048,276	403,941	137,637	5,589,854
Artillery establishments (personnel, general expenses, transportation)	9,192,755	344,445	68,495	9,605,695
Artillery establishments (purchase and manufacture of material and ammunition)	18,624,880			18,624,880
Government explosive factories	5,243,600			5,243,600
Engineer establishments	14,231,060	2,248,080	688,920	17,168,060
Fuel and light	261,500	10,900	800	273,200
Disabled soldiers	309,025			309,025
Unemployed and reduced pay	846,502			846,502
Relief and bounties	6,142,360			6,142,360
New special allowances to veterans	650,000			650,000
Secret expenditures	530,000			530,000
Pay of general officers and assimilated persons of the reserve cadre	3,223,700			3,223,700
Expenditures to be restored—Tunis gendarmerie			323,943	323,943
Totals	555,881,294	50,806,219	14,783,268	622,470,781

Extraordinary expenditures.

	Francs.
Siege train	500,000
Powder magazines	40,000
Field equipment	800,000
Armament of garrisons	430,000
Armament of coasts	4,260,350
Small arms	3,559,800
Ammunition	1,800,000
Experiments (artillery)	500,000
Building and machinery (artillery)	1,200,000
Defense of Cherbourg	1,000,000
Barracks	2,300,000
Drill and firing grounds, etc	6,000,000
Construction of strategic roads	100,000
Improvements in isolated forts	650,000
Military telegraphy and ballooning	450,000
Fortifications, land defense	3,200,000
Fortifications, coast defense	3,300,000
Engineer stores	200,000
Reserve, engineers	100,000
Establishments (intendance)	350,000
Establishments (medical)	450,000
Reorganization of the defenses of Bizerte	6,966,000
Subsistence	150,000
Clothing	742,000
Medical service	100,000
Improvements in civil hospitals in the departments	455,600
Horse equipment	40,000
Railroads	1,390,000
Geographical service	110,000
Improvements in armament (law of February 17, 1898)	30,000,000
Total	71,143,750

The effective strength which served as a basis for the budget for 1901 differs as follows from that of 1900:

	Active army.		Gendarmerie.	
	Officers.	Men.	Officers.	Men.
1900	28,902	545,622	742	25,157
1901	29,002	543,816	711	23,996
Increase	100			
Decrease		1,806	31	1,161

The following tables show the distribution of staff, military schools, arms of the service, etc.

Staff.

	Home.			Algeria and Tunis.			Total.		
	Officers.	Noncommissioned officers.	Total.	Officers.	Noncommissioned officers.	Total.	Officers.	Noncommissioned officers.	Total.
Generals of division	107		107	6		6	113		113
Generals of brigade	204		204	16		16	220		220
Officers of the general staff service	754		754	58		58	812		812
Archivists	163		163	17		17	180		180
Officers of the controle service	52		52				52		52
Intendance officers	268		268	47		47	315		315
Special artillery staff	876	421	1,297	84	49	133	960	470	1,430
Special engineer staff (officers, adjoints, etc	874	280	1,154	136	71	207	1,010	351	1,361

Reserve cadre.

Generals of division	133	Military intendants	38
Generals of brigade	217	Inspecting physicians and pharmacists	17
Controleurs general	14		

Personnel hors cadres or not classed in troop units.

Branch of service.	Home.			Algeria and Tunis.			Total.		
	Officers.	Noncommissioned officers.	Total.	Officers.	Noncommissioned officers.	Total.	Officers.	Noncommissioned officers.	Total.
I.—PERSONNEL HORS CADRES.									
Recruiting service	172		172	3		3	175		175
Penitentiaries and prisons	5		5	13		13	18		18
Native affairs				73		73	73		73
Total personnel hors cadres	177		177	89		89	266		266
II.—PERSONNEL NOT CLASSED IN TROOP UNITS.									
Medical personnel:									
Surgeons	306		306	151		151	457		457
Pharmacists	71		71	43		43	114		114
Administrative officers of the medical service	226		226	124		124	350		350
Total medical personnel	603		603	318		318	921		921
Administrative personnel	889	253	1,142	189	217	406	1,078	470	1,548
Veterinarians	32		32	7		7	39		39
Military interpreters	1		1	61		61	62		62
Total personnel not classed in troop units	1,525	253	1,778	575	217	792	2,100	470	2,570
Total of the personnel outside of the staffs, schools, and troop units	1,702	253	1,955	664	217	881	2,366	470	2,836

Military schools.

Name of school.	Officers.	Noncommissioned officers, corporals, and men.	Total.
Prytanée militaire (preparatory school for sons of officers without means)	8	46	54
Polytechnic school		38	38
Special military school (St. Cyr)	64	*1,326	1,390
School of application for artillery and engineers	184	41	225
Superior war school	96	288	384
School of application for cavalry	59	274	333
School of application of medicine and military pharmacy	15	27	42
School of administration		59	59
Normal school of gymnastics		141	141
Normal school of musketry		79	79
School of application for infantry fire		96	96
Infantry school		285	285
Artillery and engineer school		94	94
Preparatory school of infantry		240	240
Preparatory school of cavalry		67	67
Preparatory school of artillery and engineers		60	60
Hériot orphan asylum		40	40
Medical school		46	46
Total	426	3,247	3,673

NOTE.—This table is as it is given in the budget. In cases in which no officers are given, the officers are probably included in regimental strength.

* This includes students (cadets), to the number of 960.

Distribution of the various arms of the service.

	Home.			Algeria and Tunis.			Grand total.		
	Officers.	Noncommissioned officers, corporals, and men.	Total.	Officers.	Noncommissioned officers, corporals, and men.	Total.	Officers.	Noncommissioned officers, corporals, and men.	Total.
INFANTRY.									
163 regiments of infantry of the line of 4 battalions each, less 115 companies	11,237	282,337	293,574				11,237	282,337	293,574
30 battalions of rifles of 6 companies each	1,002	28,770	29,772				1,002	28,770	29,772
4 regiments of zouaves of 5 battalions of 4 companies each, plus 2 depot companies, of which 1 regiment is in Tunis and 4 battalions at home	74	2,272	2,346	344	11,149	11,493	418	13,421	13,839
5 battalions of light infantry of Africa, of which 3 are in Tunis				165	7,605	7,770	165	7,605	7,770
4 companies of disciplinary fusiliers, of which 1 company is in Tunis				16	1,000	1,016	16	1,000	1,016
2 foreign regiments of 6 battalions of 4 companies each, plus 2 depot companies, (of which 2 battalions are in Tunis)				204	10,386	10,590	204	10,386	10,590
4 regiments of Algerian sharpshooters of 6 battalions of 4 companies each, plus 1 depot company, 1 regiment being in Tunis				504	20,484	20,988	504	20,484	20,988
1 company of Saharian sharpshooters				11	275	286	11	275	286
Total infantry	12,313	313,379	325,692	1,244	50,899	52,143	13,557	364,278	377,835
ADMINISTRATIVE TROOPS.									
21 sections of staff and recruiting secretaries, 1 being in Algeria with a detachment in Tunis		1,651	1,651		229	229		1,880	1,880
25 sections of military administrative clerks and workmen, 3 being in Algeria, with a detachment in Tunis		6,217	6,217		1,706	1,706		7,923	7,923
25 sections of military-hospital attendants, 3 being in Algeria, with a detachment in Tunis		2,532	2,532		2,088	2,088		4,620	4,620
Total administrative troops		10,400	10,400		4,023	4,023		14,423	14,423
CAVALRY.									
79 regiments of 5 squadrons each (13 of cuirassiers, 31 of dragoons, 21 of rifles, and 14 of hussars)	3,463	55,776	59,239				3,463	55,776	59,239
6 regiments of African rifles of 5 squadrons each, 1 regiment being in Tunis				258	4,722	4,980	258	4,722	4,980
8 companies of remount cavalry (3 being in Algeria)	9	2,024	2,033	18	848	866	27	2,872	2,899
3 regiments of spahis of 5 squadrons each				123	2,361	2,484	123	2,361	2,484
1 regiment of Tunisian spahis of 5 squadrons				41	926	967	41	926	967
Remount service	17		17	5		5	22		22
Saharian spahis (1 squadron less 1 platoon)				6	142	148	6	142	148
Total cavalry	3,489	57,800	61,289	451	8,999	9,450	3,940	66,799	70,739

Distribution of the various arms of the service—Continued.

	Home.			Algeria and Tunis.			Grand total.		
	Officers.	Noncommissioned officers, corporals, and men.	Total.	Officers.	Noncommissioned officers, corporals, and men.	Total.	Officers.	Noncommissioned officers, corporals, and men.	Total.
ARTILLERY.									
18 battalions of foot artillery, 1 battery being in Algeria and 2 in Tunis	526	13,833	14,359	14	387	401	540	14,220	14,760
40 regiments of field artillery, 3 mounted batteries being in Tunis	3,193	47,337	50,530	27	309	336	3,220	47,646	50,866
African batteries				64	2,996	3,060	64	2,996	3,060
Musicians of artillery schools	19	741	760				19	741	760
10 companies of workmen	48	2,849	2,897	2	291	293	50	3,140	3,190
3 companies of artificers	12	303	315				12	303	315
Mountain batteries	60	2,053	2,113				60	2,053	2,113
Total artillery	3,858	67,116	70,974	107	3,983	4,090	3,965	71,099	75,064
ENGINEERS.									
6 regiments of engineers (sappers and miners, 4 companies in Algeria and 2 in Tunis)	411	8,662	9,073	25	774	799	436	9,436	9,872
1 regiment of 3 battalions of railroad sappers, 1 company in Algeria	61	1,895	1,956	4	160	164	65	2,055	2,120
Telegraphists and engineer drivers		305	305		552	552		857	857
Total engineers	472	10,862	11,334	29	1,486	1,515	501	12,348	12,849
TRAIN.									
20 squadrons at home and 12 mixed companies in Algeria and Tunis	360	4,594	4,954	52	2,253	2,305	412	6,847	7,259
Orderlies of staff officers		2,730	2,730		476	476		3,206	3,206
Total train	360	7,324	7,684	52	2,729	2,781	412	10,053	10,465
RECAPITULATION.									
Infantry	12,313	313,379	325,692	1,244	50,899	52,143	13,557	364,278	377,835
Administrative troops		10,400	10,400		4,023	4,023		14,423	14,423
Cavalry	3,489	57,800	61,289	451	8,999	9,450	3,940	66,799	70,739
Artillery	3,858	67,116	70,974	107	3,983	4,090	3,965	71,099	75,064
Engineers	472	10,862	11,334	29	1,486	1,515	501	12,348	12,849
Train	360	7,324	7,684	52	2,729	2,781	412	10,053	10,465
Grand total	20,492	466,881	487,373	1,883	72,119	74,002	22,375	539,000	561,375

NOTE.—There are also included in the budget the gendarmerie and the garde républicaine. The former consists of 26 legions in France (624 officers and 20,977 men), 4 companies in Algeria (31 officers and 1,211 men), and a Tunisian detachment (4 officers and 139 men). The latter consists of a legion of 3 battalions of infantry of 4 companies each, and 4 squadrons of cavalry (total strength, 83 officers and 2,910 men).

GERMANY.

Military budget for 1902 compared with the amounts appropriated for 1901.

[From report of Lieut. Col. John B. Kerr, Ninth Cavalry, United States Military Attaché at Berlin, and the Official Budget.]

Branch of service.	1902.	1901.	Increase.	Decrease.
Current expenditures:	*Marks.**	*Marks.**	*Marks.**	*Marks.**
War ministry	3,098,828	2,986,243	112,585	
Military chests	438,455	442,665		4,210
Supply department	3,035,210	2,997,735	37,475	
Military chaplains	1,054,104	1,032,732	21,372	
Administration of military justice	1,317,635	1,396,790		79,155
Imperial military court	522,647	512,880	9,767	
Higher troop commanders	3,525,369	3,507,096	18,273	
Governors of fortified places, garrison commanders, and their aids	665,191	656,373	8,818	
Aids-de-camp and officers in special positions	1,215,626	1,212,726	2,900	
General staffs and national survey	3,393,856	2,933,096	410,760	
Engineers and pioneers	2,447,917	2,386,119	61,798	
Pay of troops	131,673,478	130,195,302	1,478,176	
Allowances in kind	144,124,835	141,889,874	2,234,961	
Clothing and equipment of troops	31,539,737	30,898,805	640,932	
Garrison administration and commutation	60,603,441	59,085,731	1,517,710	
Garrison construction	1,817,484	1,741,649	75,835	
Medical service	10,156,501	10,014,357	142,144	
Administration of train depots and care of field material	1,741,626	1,726,790	14,836	
Subsistence of replenishment and reserve troops	3,479,256	3,312,158	167,098	
Purchase of remounts	12,417,444	11,973,351	444,093	
Administration of remount depots	3,396,410	3,208,530	187,880	
Traveling allowances and allowances for relay and transportation	9,281,111	9,347,147		66,036
Military education and training	8,094,222	7,834,906	259,316	
Military prisons	847,983	853,977		5,994
Artillery and ordnance	44,544,860	43,944,389	600,471	
Technical artillery establishments	1,268,790	1,223,911	44,879	
Construction and maintenance of forts	3,079,181	3,019,644	59,537	
Extra allowances for quarters	11,133,515	11,031,980	101,535	
Reliefs and extra indemnities to active military persons and civilians not provided for elsewhere	1,342,207	1,334,657	7,550	
Extra allowances to military widows' fund	3,134,000	3,039,000	95,000	
Miscellaneous expenditures	1,909,107	1,660,445	248,662	
Military administration of Bavaria	63,340,332	62,226,951	1,113,381	
Total	569,640,358	559,628,009	10,012,349	
Extraordinary expenditures	94,946,372	114,027,561		19,081,189
Total current and extraordinary expenditures	664,586,730	673,655,570		9,068,840
Expenses occasioned by the expedition to East Asia	39,558,824	123,322,000		83,763,176

* One mark equals $0.238.

Military budget for the colonies for 1902 compared with the amounts appropriated for 1901.

	1902.	1901.	Increase.	Decrease.
	Marks.	*Marks.*	*Marks.*	*Marks.*
East African protectorate	2,389,031	2,301,343	87,688	
Kamerun protectorate	1,083,076	1,051,305	31,771	
Togo protectorate	104,100	104,100		
Southwest African protectorate	2,396,574	2,250,076	146,498	
Kiauchau protectorate	2,488,143	2,149,149	338,994	
Total	8,460,924	7,855,973	604,951	

The following are the more important changes for 1901:

On October 1, 1901, there were added to the permanent organization 5 machine-gun detachments, 1 regiment of 5 squadrons mounted rifles (Jäger zu Pferde), 1 foot-artillery regiment, 1 pioneer battalion, a second company with the balloon battalion (Berlin), a third company with the Hessian train battalion, and a draft-horse detachment for the balloon battalion (Berlin).

To the Kaiser Wilhelm Academy for the military education service was added a scientific senate, consisting of the general staff surgeon of the army, one vice-president, and 15 ordinary members. The purpose is to assist the general staff surgeon of the army by giving opinions in scientific medical questions.

The following changes are proposed in the military appropriation bill for 1902:

It is proposed to add to the permanent organization 7 machine-gun detachments of 6 guns each (eventually it is expected to have 1 machine-gun detachment for each corps) and 10 companies of foot artillery.

It is further proposed to establish a military technical high school for the purpose, among others, of educating officers for employment in the corps of engineers; to reorganize the fortification-construction staff; to reconstruct and complete the land fortifications; to establish or increase several higher engineer authorities, and to increase the general staffs of larger fortresses, for which purpose three chiefs of general staff are proposed.

By the proposed changes in the strength of the army, which will begin to be carried out after October 1, 1902, the effective peace strength fixed by the law of March 25, 1899, will be reached in the course of the fiscal year 1903.

An expenditure of 26,191,000 marks is proposed for the expedition to East Asia.

Budgetary strength of the German army in 1901, showing changes for 1902.

Branch of the service.	Officers.		Noncommissioned officers and men.		
	Strength in 1901.	Increase for 1902.	Strength in 1901.	Increase for 1902.	Decrease for 1902.
Infantry:					
Infantry proper, 216 regiments	12,073		367,478		13
Rifles, 18 battalions	388		11,182		6
Machine guns, 5 detachments (13 for 1902)	15	36	335	656	
Recruiting depots (293)	917	13	5,782	107	
Total infantry	13,393	49	384,777	744	
Cavalry: 93 regiments	2,433	3	66,849	94	
Artillery: 94 regiments field, 18 regiments foot	3,955	51	88,237	1,294	
Pioneers: 26 battalions	595	3	15,419		10
Communication troops:					
Railroad troops (3 regiments, 1 battalion, 2 companies)	185		4,502		1
Telegraph troops (3 battalions, 2 companies, 1 detachment)	50		1,518	9	
Balloon troops, 2 detachments (1 battalion and 1 detachment for 1902)	16	1	397		
Total communication troops	251	1	6,417	8	
Train: 17 battalions	331		8,238	16	
Special services	3,181	39	5,056		654
Imperial military court	6	1			
Total army	24,145	147	574,993	1,492	

Noncombatants.	Strength in 1901.	Increase for 1902.	Decrease for 1902.
Surgeons	2,190	8	
Paymasters and various	1,064		
Veterinary surgeons	680		2
Armorers	1,012		1
Saddlers	94		1
Total noncombatants	5,030	4	

RECAPITULATION.

	1901.	1902.
Officers	24,145	24,292
Noncommissioned officers and enlisted men	574,993	576,485
Noncombatants	5,030	5,034
Grand total	604,168	605,811

Composition of the general staff.

PRUSSIA.

	Number.
Chief of the general staff of the army	1
Aids	2
Generalquartiermeister	1
Oberquartiermeisters	3
Chiefs of section in the great general staff, or chiefs of the general staffs at general headquarters and in large fortresses	31
Captains and field officers	181
Railway commissioners:	
Field officers with rank and allowances of regimental commanders	3
Field officers with lesser rank	16
Captains, first class	3
Retired (pensionirte) officers, field officers, or captains	5

Composition of the general staff—Continued.

SAXONY.

	Number.
Chiefs of the central section, or chiefs of the general staff at general headquarters	3
Captains and field officers	15
Railway commissioners: Field officers	2

WURTTEMBERG.

Chief	1
Captains and field officers	4
Railway commissioner: Field officer	1

BAVARIA.

Chief of the general staff of the army	1
Chief of section in the general staff	1
Chiefs of the general staffs at general headquarters	3
Officers, captains, and field officers	22
Railway commissioners:	
Field officers	4
Captain	1

GREAT BRITAIN.

MEMORANDUM OF THE SECRETARY OF STATE RELATING TO THE ARMY ESTIMATES FOR 1901-02.

The total of the army estimates for 1901–02 amounts to £87,915,000, while the number of men to be voted is 450,000.

The following table shows the comparison with the figures for the current year:

	1900–01.	1901–02.
Vote A	430,000	450,000
Votes 1–16	*£88,999,400	£87,915,000

* Including supplementary estimates.

As regards Vote A (men), 220,000 may be regarded as forming the permanent establishment of the army, the balance being temporary additions due to the war in South Africa and operations in China.

The £87,915,000 is accounted for as follows:

(*a*) Permanent additions voted in 1900–01 and earlier years, including automatic increases, £25,451,000.
(*b*) Permanent additions to be voted 1901–02, £1,912,000.
(*c*) Temporary increases, £2,322,000.
(*d*) War services, £58,230,000.

(*a*) PERMANENT ADDITIONS VOTED IN 1900–01 AND AUTOMATIC INCREASES.

As shown in Army Estimates, 1900–01, the total for normal services and permanent additions amounted to	£23,702,700
The estimates for 1901–02 have also to allow for—	
(1) Complete provision for new forces raised in 1900–01	655,000
(2) Contribution payable to India toward the cost of Aden, as well as the transport of troops to and from India	230,000
(3) Rise in prices of stores and fuel	350,000
(4) Growth of volunteer force	180,000
(5) Hutting for troops at home and annuities for repayment of loans for works	280,000
(6) Miscellaneous	53,300
Total	25,451,000

(*b*) PERMANENT ADDITIONS TO BE VOTED, 1901–02, £1,912,000.

These include:

(1) The formation of "garrison" battalions for service on the Mediterranean and other nontropical stations abroad.
(2) Measures affecting the militia, yeomanry, and volunteers.
(3) Provision of staff for army corps and reorganization of army medical services.
(4) Extension of system of registration of horses and transport required on mobilization.
(5) New system of clothing throughout the army.

The above measures and others affecting army reorganization will be fully dealt with on the introduction of the army estimates, so I refrain from explaining them in detail in the present memorandum.

(*c*) TEMPORARY INCREASES, £2,322,000.

This represents the further installment for the rearmament of our fortresses and for stores, to which allusion was made in the memorandum accompanying the army estimates for 1900–01.

(*d*) WAR SERVICES, £58,230,000.

The provision under this head is based on the assumption that for the first four months of the new financial year the field force in South Africa will be maintained at full strength, and that a gradual diminution will subsequently take place.

Provision is made for the transport home of the troops, and the gratuities payable on demobilization, as well as the special war gratuity, which, though voted in the present financial year, will not, owing to the prolongation of the war, be paid to any large extent until 1901–02.

The explanations of the increases on the different votes are as follows:

VOTE 1—PAY, ETC.—This vote shows a net increase of £3,207,500, of which £2,239,000 is due to war and £968,500 to "normal" services.

The latter head covers:

(*a*) The pay, etc., of the new "garrison" battalions already referred to.

(*b*) Two additional Indian native battalions for service at Singapore and Hongkong.

(*c*) The further provision required for various increases voted in 1900–01.

(*d*) The contribution to Indian revenues referred to above, as explained in the papers recently laid before Parliament.

VOTE 2—MEDICAL SERVICES.—The increase on this vote amounts to £183,600, of which £58,700 is for war and £124,900 for permanent additions. The bulk of the latter increase is for the "reorganization of the army medical services," to which reference has been made.

VOTE 3—MILITIA.—Net increase £374,000. The provision for war services show a decrease of £40,000, while the increase for permanent services amounts to £414,000. This is mainly accounted for—

(*a*) By a new system of consolidated bounties, estimated cost, £150,000.

(*b*) By the formation of a new militia reserve, for which £250,000 is provided.

(*c*) By the issue to militia noncommissioned officers and men of the same rates of pay and extra-duty pay as are given to similar ranks in the regulars, at a cost of £12,000.

VOTE 4—YEOMANRY.—There is a net increase of £231,000 on this vote, but the increase, as compared with the normal, is £300,000, which is to provide for a considerable addition to the number of the force, and an extended period of training, accompanied by higher rates of allowances.

VOTE 5—VOLUNTEERS.—This vote shows an apparent decrease of £500,000, but there is in reality an increase of £330,000, as compared with the ordinary provision for this force.

The large growth of the volunteer force necessitates the provision for increased capitation and camp allowances, while a considerable sum, £150,000, has also been taken for the extended training of a certain number of battalions of infantry and batteries of artillery.

VOTE 6—TRANSPORT AND REMOUNTS.—This vote shows a decrease of £3,823,000, which arises entirely on war services. Money is taken in this vote for the transport of the troops to be brought away from South Africa. The only service requiring special mention is the additional provision of £100,000 for registration of horses and transport to be available for military purposes in time of emergency.

VOTE 7—SUPPLIES.—There is a net increase on this vote of £582,000, which is mainly due to the permanent additions to the army already referred to. Provision is also made for the grant of the messing allowance to militiamen during their annual training.

VOTE 8—CLOTHING.—The increase on the normal vote is £180,000, which is accounted for by the initial cost of the new system of clothing about to be adopted throughout the army (including the militia).

VOTE 9—WARLIKE STORES, ETC.—The increase for normal services amounts to £2,600,000; of this sum £2,322,000 is due to the further installment required for accelerating the re-armament of fortresses at home and abroad, while the balance is required to meet a general rise in the price of stores.

VOTE 10—WORKS, ETC.—As compared with the normal vote for 1900–01, this vote, apart from war services, shows an increase of £283,300, being due to the provision of hutting for troops at home, and to increased annuities for the repayment of loans for works.

VOTES 11 AND 12—EDUCATION AND MISCELLANEOUS.—There is nothing that calls for special mention in the case of these two votes, as, apart from war services, there is no change from the amounts taken in the current year's estimates.

VOTE 13—WAR OFFICE.—Apart from war services this vote shows an increase of £5,000, which is mainly due to the appointment of an additional officer as inspector general of recruiting, as well as a deputy assistant adjutant general for recruiting, to an increase in the pay of the commander in chief, and to an addition to the number of officers attached temporarily for various staff duties.

VOTES 14–16—NONEFFECTIVE SERVICES.—The net increase of £518,000 on these votes is due to charges in connection with the war. The only service calling for special notice is the provision under subhead K of vote 15, of a sum of £56,000 to cover the grant of pensions from the 1st of April next to the widows and children of noncommissioned officers and men who have died as the result of active operations. The scheme is now being formulated under the direction of the treasury.

ST. JOHN BRODRICK.

February 28, 1901.

Abstract of estimates for 1901–02.

Vote Nos.		Net estimate 1901–02.	Net estimate 1900–01.
	I.—NUMBERS.		
A	Men on the home and colonial establishments, exclusive of those serving in India	450,000	430,000
	II.—EFFECTIVE SERVICES.		
1	Pay, etc., of army general staff, regiments, reserves, and departments	£21,657,500	£18,450,000
2	Medical establishment, pay, etc	1,088,600	905,000
3	Militia, pay, bounty, etc	2,662,000	2,288,000
4	Yeomanry cavalry: Pay and allowances	375,000	144,000
5	Volunteer corps: Pay and allowances	1,230,000	1,730,000
6	Transport and remounts	15,977,000	19,800,000
7	Provisions, forage, and other supplies	18,782,000	18,200,000
8	Clothing establishments and services	4,825,000	5,530,000
9	Warlike and other stores: Supply and repair	13,450,000	13,200,000
10	Works, buildings, and repairs: Cost, including staff for engineer services	3,281,000	4,730,700
11	Establishments for military education	119,200	113,800
12	Miscellaneous effective services	218,200	206,900
13	War office; salaries and miscellaneous charges	305,000	275,000
	Total effective services	83,970,500	85,573,400
	III.—NONEFFECTIVE SERVICES.		
14	Noneffective charges for officers, etc.	2,271,000	1,861,000
15	Noneffective charges for men, etc	1,485,000	1,379,000
16	Superannuation, compensation, and compassionate allowance	188,500	186,000
	Total noneffective services	3,944,500	3,426,000
	Total effective and noneffective charges	87,915,000	88,999,400

The provision for ordinary and war services is as follows:

For war services:		
South Africa	£56,070,000	£61,286,700
China	2,160,000	3,450,000
Total	58,230,000	64,736,700
For ordinary services	29,685,000	24,262,700
Total	87,915,000	88,999,400

Composition of the general staff.

	Numbers.	
	1901–02.	1900–01.
Generals	3	3
Lieutenant generals	7	7
Major generals	27	25
Brigadier generals	9	7
Colonels on the staff	32	34
Deputy adjutants general	3	3
Assistant adjutants general	32	31
Deputy assistant adjutants general, including district inspectors of musketry	80	80
Brigade majors	18	18
Senior aids-de-camp and assistant military secretaries	5	5
Aids-de-camp	42	41
Staff captains	16	14
Garrison and camp quartermasters	5	4
	279	272
Aids-de-camp to the king	6	6
Lieutenant of the Tower of London	1	1
Major of the Tower of London	1	1
Recruiting staff:		
Chief recruiting staff officer	1	1
Recruiting staff officers, Class I	1	3
Recruiting staff officers, Class II	10	8
Conducting staff sergeants, etc	31	30

The above is exclusive of the headquarters staff at the war office, which consists of the commander in chief, private secretary, and 4 aids; adjutant general, 2 deputies, 7 assistants, and 11 deputy assistants; quartermaster general, 3 assistants, and 3 deputy assistants; inspector general of fortifications, 2 deputies, 5 assistants, and 1 artillery adviser; director general of ordnance, 1 deputy, 2 assistants, and 4 deputy assistants; military secretary and 4 assistants; director of military intelligence; inspectors general of auxiliary forces, recruiting and remounts; director of army schools; military transport officer; staff paymaster; 10 staff captains; 3 inspectors (various); 7 engineer officers; chaplain general; director general army medical service, 1 deputy, 1 assistant, and 2 deputy assistants; a total of 89 officers, besides officers temporarily attached, and extra staff of military intelligence division during the war in South Africa. The number in 1900–01 was 84.

Number of men on the regular establishment, exclusive of India.

		Officers.	Warrant officers, sergeants, and other enlisted men.	All ranks.	
				1901–02.	1900–01.
REGIMENTAL ESTABLISHMENTS.					
Cavalry:					
Household regiments	3	555	13,715	14,270	14,238
Line regiments	19				
Artillery:					
Horse artillery batteries	19	1,541	38,101	39,642	38,985
Field artillery batteries	116				
Mountain artillery batteries	4				
Garrison artillery companies	83				
Engineers:					
Field units	28	702	9,429	10,131	9,957
Telegraph divisions	3				
Fortress units	25				
Submarine-mining units	14				
Railway companies	3				
Survey companies	4				
Infantry:					
Foot guards battalions	10	3,501	115,442	118,943	115,137
Line battalions	112				
Line depots battalions	68				
Army service corps		490	6,584	7,074	7,104
Royal army medical corps*		551	3,045	3,596	3,595
Colonial corps and native Indian corps		419	14,016	14,435	12,190
Departmental corps		248	2,572	2,820	2,646
Total, regimental establishments		8,007	202,904	210,911	203,852
STAFF OF AUXILIARY FORCES.					
Honorable artillery company		1	4	5	5
Yeomanry cavalry		19	149	*168	167
Light horse volunteers		1	3	4	4
Militia artillery†		56	695	751	749
Volunteer artillery		67	350	417	401
Militia engineers‡		§	118	118	118
Volunteer engineers		¶	90	90	79
Militia infantry		251	3,525	3,776	3,782
Volunteer infantry		224	1,290	1,514	1,400
Militia medical staff corps			17	17	17
Volunteer medical staff corps		1	17	18	14
Total, staff of auxiliary forces		620	6,258	6,878	6,736
Total, regimental and auxiliary forces		8,627	209,162	217,789	210,588
GENERAL AND DEPARTMENTAL STAFF.					
General staff (including headquarters staff)		367	136	*503	490
Army pay department		236		236	209
Army veterinary department		110	7	117	77
Chaplains' department		86		86	86
Army medical staff (including headquarters staff)		96		96	96
Total, staff and departments		895	143	1,038	958
MISCELLANEOUS ESTABLISHMENTS (EXCLUSIVE OF OFFICERS AND MEN INCLUDED UNDER "REGIMENTS.")					
Staff of schools for instruction in gunnery		30	197	227	216
Staff of school of musketry		7	52	59	59
Gymnastic staff		16	134	150	135
Royal military academy		21	26	47	46
Royal military college		28	35	63	63
Other colleges and schools		38	50	88	87
Army school establishments		16	207	223	208
Ordnance factories		17		17	15
Miscellaneous establishments		50	49	99	74
Total, miscellaneous establishments		223	750	973	903
Grand total		9,745	210,055	219,800	212,449
Additional numbers, imperial, Indian, colonial, and irregular forces, during the war in South Africa and the expedition to China				230,200	217,551
Number to be voted				450,000	430,000

---

* To be increased to an extent not yet determined.

† Including Channel Islands and colonial militia.

‡ Including submarine-mining militia for Malta and Bermuda.

§ The 5 officers are included in establishment of royal engineers.

¶ The 21 adjutants are included in establishment of royal engineers.

Establishment of British regiments serving in India.

	Officers.	Warrant officers, sergeants, and other enlisted men.	All ranks.	
			1901–02.	1900–01.
Cavalry of the line, 9 regiments	261	5,374	5,635	5,617
Artillery:				
11 horse batteries	495	12,912	13,407	13,399
42 field batteries				
8 mountain batteries				
27 garrison companies				
Infantry, 52 battalions	1,508	52,180	53,688	53,682
Engineers	330	3	333	333
Army medical corps	332		332	332
Inspectors ordnance machinery, armorers, etc	6	117	123	121
Total	2,932	70,586	73,518	73,484

In addition to the British army stationed in India, there is a native army, according to the latest returns on hand, of 1,670 European officers and noncommissioned officers, and 141,523 native officers and men. The expense of maintenance of these troops is borne by the revenues of India. It is not included in the British army estimates unless these troops are used for service in the British Empire outside of India.

Number of officers and men on the regimental establishments of the army, army reserve, and auxiliary forces.

	Normal establishments, all ranks.		Effective, all ranks.	
	1901–02.	1900–01.	Number by latest returns.	Period of latest return.
Regular forces (regimental), home and colonial	207,215	202,010	* 335,837	Jan. 1, 1901.
Native Indian regiments	3,696	1,842	† 22,313	Do.
Army reserve, first class	90,000	90,000	‡ 5,251	Do.
Militia (including permanent staff and old militia reserve)	131,539	132,952	100,098	Do.
Militia reserve (new)	50,000			
Militia of Channel Isles	3,271	3,554	3,428	July 1, 1900.
Militia, Malta and Bermuda	2,731	2,731	2,098	Jan. 1, 1901.
Yeomanry (including permanent staff)	35,000	11,907	8,657	Summer training, 1900.
Volunteers (including permanent staff)	375,000	265,061	277,900	Jan. 1, 1901.
Total home and colonial establishments	898,452	710,057	755,582	
Regular forces (regimental) on Indian establishments	73,518	73,484	63,023	Jan. 1, 1901.
Total	971,970	783,541	§ 818,605	

* Including imperial yeomanry 9,354, and enlisted volunteers 7,000.
† Including 19,126 with China expedition.
‡ Including 2,163 enlisted volunteers.
§ Exclusive of colonial forces serving in South Africa and China.

Statement showing the difference between the numbers voted for 1900-01 and those proposed for 1901-02.

	Regiments.	Staff of militia yeomanry and volunteers.	Staff departments, etc.	Additional numbers, temporarily for war in South Africa.	Total.
Numbers proposed, 1901-02	210,911	6,878	2,011	230,200	450,000
Numbers voted, 1900-01	203,852	6,736	1,861	217,551	430,000
Increase	7,059	142	150	12,649	20,000

Statement showing the variations in the different ranks.

	Officers.	Warrant officers.	Sergeants.	Drummers, etc.	Rank and file.	All ranks.
REGULAR ARMY.						
Increases.						
Cavalry of the line	4	--------	3	--------	25	32
Artillery:						
Horse	16	5	4	8	71	104
Field	46	−2	21	40	418	523
Mountain	1	--------	--------	--------	4	5
Garrison	5	--------	9	--------	11	25
Engineers	19	7	54	--------	94	174
Foot guards	23	2	42	16	56	139
Infantry, 8 garrison battalions	224	16	368	128	7,660	8,396
Royal army medical corps	1	--------	--------	--------	--------	1
Royal Malta artillery	--------	--------	1	−2	8	7
Local artillery (natives)	--------	--------	6	2	103	111
West African regiment	9	--------	12	2	250	273
Native Indian regiments	60	--------	82	32	1,680	1,854
Army ordnance department	5	--------	1	--------	4	10
Army ordnance corps	--------	4	30	--------	--------	34
Army pay corps	--------	8	22	--------	100	130
Total increases	413	40	655	226	10,484	11,818
Decreases.						
Infantry of the line	128	8	216	77	4,300	4,729
Army service corps	--------	1	3	--------	26	30
Net increase	285	31	436	149	6,158	7,059
STAFF OF AUXILIARY FORCES.						
Increases.						
Yeomanry cavalry	--------	--------	1	--------	--------	1
Militia artillery	1	35	−35	1	--------	2
Militia engineers	--------	5	−5	--------	--------	--------
Militia infantry	−6	129	−129	--------	--------	−6
Volunteer medical staff corps	--------	--------	4	--------	--------	4
Volunteer artillery	1	--------	15	--------	--------	16
Volunteer engineers	--------	--------	11	--------	--------	11
Volunteer infantry	11	--------	103	--------	--------	114
Net increase	7	169	−35	1	--------	142
STAFF AND MISCELLANEOUS.						
Sundry increases	*88	−6	59	--------	9	150
Total increase in normal numbers	380	194	460	150	6,167	†7,351

*Including 40 veterinary officers, 27 paymasters, 13 general staff, and 8 miscellaneous.

†Exclusive of 12,649 added for war purposes temporarily.

Approximate normal distribution of regimental establishments.

	Cavalry.		Artillery.					Engineers.		Infantry (excluding colonial corps).		Army service corps.	Army medical corps.		Colonial and native Indian corps.				Ordnance and pay Corps, all ranks.	Total, all ranks.
			Number of batteries or companies.												Number of companies.					
	Number of regiments.	All ranks.	Horse.	Field.	Mountain.	Garrison.	All ranks.	Number of companies.	All ranks.	Number of battalions.	All ranks.		Officers.	Men.	Infantry.	Artillery.	Engineers.	All ranks.		
Home	19	12,717	19	112	2	45	31,454	57	7,839	89	90,665	6,607	397	2,379					2,275	154,333
Colonies and Egypt:																				
Mediterranean—																				
Gibraltar						7	1,765	4	415	3	3,036	89	16	80					65	5,466
Malta						9	2,274	3	339	6½	7,067	71	24	141		6		859	65	10,840
Cyprus									1	½	123	1	1	5					4	135
Africa—																				
Cape and Natal	2	1,186		3	1	2	1,076	2	337	12	12,163	125	26	170					102	15,185
Mauritius						2	346	1	118	1	1,012	5	5	35	16	2		2,048	14	3,583
St. Helena						1	159		32			4	1	4	4			517	10	727
Sierra Leone						1	115		10			5	14	6	12	2	1	2,100	12	2,262
Egypt	1	539		1	1		285	1	114	4	4,092	100	17	94		1		124	71	5,436
Central Africa															8			1,100		1,100
America—																				
Halifax						2	533	2	177	1	1,012	13	5	14					29	1,783
Esquimault						1	208	1½	97			5	1	6					10	327
West Indies						5	1,130	3	362	2	2,029	26	23	61	19	2	2	2,661	79	6,371
Asia—																				
Ceylon and Straits Settlements						4	678	1	212	2	2,024	12	12	40	8	4	2	1,480	39	4,497
Hongkong						3	662	1	198	1	1,012	7	9	41	16	4	1	2,463	33	4,425
Weihaiwei						1	128	½	58			4	1	3	8			1,083	12	1,289
With colonial forces, and on miscellaneous duties abroad									30											30
Total, colonies and Egypt	3	1,725		4	2	38	9,359	20	2,500	33	33,570	467	155	700	91	21	6	14,435	545	63,456
India	9	5,635	11	42	8	27	13,407	1	333	52	53,688		332						123	73,518
Grand total	31	20,077	30	158	12	110	54,220	78	10,672	174	177,923	7,074	884	3,079	91	21	6	14,435	2,943	291,307

Annual regimental pay of officers of the line at home.

Rank.	Cavalry.			Infantry.			Artillery.					
							Horse.			Field, mountain, and garrison.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Lieutenant colonel	392	7	6	328	10	—	451	13	9	328	10	—
Major	273	15	—	247	17	11	337	12	6	292	—	—
Captain	237	5	—	211	7	11	273	15	—	211	7	11
Lieutenant	139	18	4	118	12	6	161	4	2	124	14	2
Second lieutenant	121	13	4	95	16	3	139	18	4	101	17	11
Quartermaster	191	12	6	164	5	—	191	12	6	191	12	6
Riding master	191	12	6				191	12	6	*173	7	6

* In field and mountain artillery.

The above are the minimum rates of pay for each grade; increases are provided as additional pay. Quartermasters and riding masters receive increases of 1s. 6d. a day for each period of five years' service, the maximum increase being 6s. after twenty years' commissioned service.

Annual allowances of officers of the line at home.

Rank.	Mess.			Forage and stabling.			Lodging.			Fuel and light.			Armament pay.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Colonel commanding a regimental district, infantry				71	9	7	82	2	6	28	7	5			
Lieutenant colonel:															
Cavalry and horse artillery				138	7	11	73	—	—	23	6	2			
Infantry, field, and mountain artillery				71	9	7	73	—	—	23	6	2			
Garrison artillery				71	9	7	73	—	—	23	6	2	91	5	—
Major:															
Cavalry	6	—	—	104	18	9	54	15	—	16	4	4			
Horse artillery				104	18	9	54	15	—	16	4	4			
Infantry	6	—	—	38	—	5	54	15	—	16	4	4			
Field and mountain artillery				38	—	5	54	15	—	16	4	4			
Garrison artillery				38	—	5	54	15	—	16	4	4	63	17	6
Captain:															
Cavalry	6	—	—	104	18	9	41	1	3	9	2	5			
Horse artillery	6	—	—	71	9	7	41	1	3	9	2	5			
Garrison artillery	6	—	—				41	1	3	9	2	5	54	15	—
Field and mountain artillery, and infantry	6	—	—				41	1	3	9	2	5			
Captain and adjutant:															
Horse artillery				104	18	9	41	1	3	9	2	5			
Field and mountain artillery				38	—	5	41	1	3	9	2	5			
Lieutenant:															
Cavalry and horse artillery	6	—	—	71	9	7	36	10	—	9	2	5			
Garrison artillery	6	—	—				36	10	—	9	2	5	36	10	—
Field and mountain artillery, and infantry	6	—	—				36	10	—	9	2	5			
Second lieutenant:															
Cavalry and horse artillery	6	—	—	71	9	7	36	10	—	9	2	5			
Garrison artillery	6	—	—				36	10	—	9	2	5	36	10	—
Field and mountain artillery, and infantry	6	—	—				36	10	—	9	2	5			

As a general rule officers are allowed a soldier servant; mounted officers, 2 soldier servants.

Total annual pay and allowances of officers of the line at home.

Rank.	Infantry.			Cavalry.			Artillery.								
							Horse.			Field and mountain.			Garrison.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Colonel commanding a regimental district*	601	14	6												
Lieutenant colonel*	551	—	9	681	16	7	741	2	10	551	—	9	642	5	9
Major†	362	17	8	455	13	1	513	10	6	400	19	9	464	17	3
After 2 years' service as such	408	—	—	492	3	1									
Captain	267	11	7	398	7	5	401	8	3	267	11	7	‡322	6	7
With brevet rank	304	1	7	434	17	5	437	18	3	304	1	7	358	16	7
Additional if adjutant§	129	5	5	91	5	—							77	12	11
Captain and adjutant							474	9	11	345	4	6			
Lieutenant	170	4	11	261	—	4	284	6	2	176	6	7	212	16	7
After 7 years as such	188	9	11				302	11	2	194	11	7	231	1	7
Additional if adjutant§	129	5	5	124	14	2							74	10	5
Second lieutenant	147	8	8	244	15	4	263	—	4	153	10	4	190	—	4
Quartermaster, minimum	215	17	5	281	5	4	275	5	4	218	19	11	219	—	11
Maximum	329	18	8	395	6	7	389	6	7	333	1	2	333	1	2
Riding master, minimum				314	14	6	237	4	11	237	4	11			
Maximum				428	15	9	351	6	2	351	6	2			

---

* "Command pay" included in the total is for a colonel commanding a regimental district 5s. a day; for lieutenant colonels it is 3s. a day, and in certain districts 5s. a day.

† If "second in command" of a battalion of infantry or regiment of cavalry, £18 5s. additional.

‡ If "position finder" or "depression range finder," £45 12s. 6d. additional.

§ When acting as adjutant, captains of cavalry receive £91 5s. additional pay, but no additional allowances; lieutenants of cavalry the additional pay, and have their forage and stabling allowance increased to that of a captain; captains and lieutenants of infantry receive the additional pay and £38 — 5d. forage and stabling allowance. In garrison artillery captains acting as adjutant or gunnery instructor receive an increase of 2s. 6d. a day, and lieutenants acting as divisional adjutant 2s. a day, and all receive the forage and stabling allowance of £38 — 5d.

Annual pay and allowances of staff officers at home.

(Abroad the allowances vary according to station.)

Staff appointment.	Staff pay, including regimental or half pay.			Allowances.												Total.		
				Forage and stabling.			Servants (1s. a day for each).			Lodging.			Fuel and light.					
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
General	2,920	—	—	272	4	7	54	15	—	301	2	6	53	4	1	3,601	6	2
Lieutenant general	2,007	10	—	205	6	3	54	15	—	250	18	9	53	4	1	2,571	14	1
Major general	1,095	—	—	171	17	1	36	10	—	200	15	—	45	1	11	1,549	4	—
Brigadier general	912	10	—	138	7	11	36	10	—	155	2	6	33	8	9	1,275	19	2
Colonel on staff	730	—	—	104	18	9	18	5	—	100	7	6	33	8	9	987	—	—
Colonel on staff (royal engineers)	912	10	—	104	18	9	18	5	—	100	7	6	33	8	9	1,169	10	—
Deputy adjutant general	547	10	—	104	18	9	18	5	—	100	7	6	33	8	9	804	10	—
Assistant adjutant general	456	5	—	71	9	7	18	5	—	100	7	6	33	8	9	679	15	10
Assistant military secretary	383	5	—	71	9	7	18	5	—	73	—	—	28	7	5	574	7	—
Deputy assistant adjutant general	383	5	—	38	—	5	18	5	—	73	—	—	28	7	5	540	17	10
Brigade major:																		
Cavalry or artillery	383	5	—	104	18	9	18	5	—	54	15	—	19	15	2	580	18	11
Infantry, etc	383	5	—	71	9	7	18	5	—	54	15	—	19	15	2	547	9	9
Aid-de-camp	273	15	—	71	9	7	18	5	—	54	15	—	19	15	2	437	19	9
Staff captain	273	15	—	38	—	5	18	5	—	54	15	—	19	15	2	404	10	7
Staff lieutenant	228	2	6	38	—	5	18	5	—	41	1	3	14	3	9	339	12	11

General Officers Commanding in certain large commands have a grant of table money to meet the expenses of necessary hospitality. When occupying unfurnished quarters they receive a furniture allowance varying from 5s. 6d. to 11s. a day, according to rank. The forage allowance is governed by the average contract price in the several military districts plus 20 per cent to meet additional cost of buying at retail. The stabling allowance is 9d. per day for the first horse and 6d. for the others. Fuel and light allowance varies with the season and the number of rooms to which entitled.

The salary of the commander in chief for 1901–02 is £5,000; of the adjutant general £2,400. These rates include all allowances except pensions for wounds and rewards for distinguished service. The pay of military attachés abroad is £800 per annum, including allowances.

*Approximate annual cost of clothing per man, regular forces, serving at home.**

Corps.	Warrant officers.			Staff sergeants.			Sergeants.			Rank and file.		
	£	*s.*	*d.*	*£*	*s.*	*d.*	*£*	*s.*	*d.*	*£*	*s.*	*d.*
Life guards	13	14	6	13	3	4	11	9	1	9	6	6
Royal horse guards	12	15	6	12	4	5	10	10	3	8	7	—
Cavalry of the line:												
Hussars	10	2	9	10	5	11	6	12	2	6	6	8
Dragoon guards and dragoons	7	10	3	7	13	5	6	6	6	6	2	2
Lancers	8	8	11	8	12	—	6	14	6	6	9	1
Royal horse artillery	9	—	3	9	2	1	8	8	9	6	4	3
Royal garrison artillery	6	7	1	6	9	11	5	9	6	4	10	11
Royal field artillery	7	11	4	7	12	8	6	12	2	5	14	6
Royal engineers (dismounted men)	9	1	9	9	3	4	6	11	6	5	6	2
Royal engineers (mounted men)	11	9	8	11	11	3	9	10	5	8	4	6
Foot guards	13	2	2	12	2	5	7	16	10	5	12	9
Infantry of the line	6	11	7	6	8	9	4	4	11	4	4	6
Highland regiments:												
Kilted	7	9	—	7	6	1	5	1	1	4	10	11
Trewed	6	16	2	6	12	11	4	7	5	4	5	8
Rifle regiments	5	9	3	5	10	4	4	2	8	4	4	1
Army service corps (dismounted men)	6	—	8	5	19	3	4	14	7	4	11	2
Army service corps (mounted men)	7	13	10	7	12	5	6	14	10	6	10	5
Royal army medical corps	6	13	7	6	5	7	4	6	8	4	2	1
Army ordnance corps	5	12	4	5	5	7	4	9	—	4	2	5
Army pay corps	6	4	10	6	1	7	4	10	5	3	18	8
Colonial corps:												
West Indian regiment	5	18	—	6	—	1	3	9	5	3	7	11
Hongkong-Singapore battalion, royal artillery							4	15	7	3	19	5
Royal Malta artillery							4	3	6	3	13	11
West African regiment							1	13	—	1	9	2

---

* These rates (which are based on the current army order price lists) include, in addition to the average annual cost of the clothing, a portion of the cost of the extra clothing and kit of necessaries issued free on enlistment.

THE DISTRIBUTION OF THE ARMY.

At the beginning of December, 1901, the principal portions of the ordinary British regular army (excluding Indian native troops, imperial yeomanry, colonial corps, and other special troops in South Africa, and local regular troops in Malta, Hongkong, and other crown colonies) consisted of 31 regiments of cavalry, 28 batteries of horse artillery, 151 of field artillery, 10 mountain batteries, 105 companies of garrison artillery, 166 battalions of infantry; of engineers, 60 field, fortress, railway, survey, and submarine-mining companies, a telegraph battalion, a field troop, a field depot, 4 field parks, 2 searchlight sections, 4 balloon sections, and a coast battalion of 10 submarine-mining sections; and 61 companies of the army service corps.

In South Africa, on the 1st instant, in the army commanded by Lord Kitchener, or on the way to join it, there were 21 cavalry regiments, 8 horse batteries, 39 field batteries, 2 mountain batteries, 11 garrison companies, and 8 ammunition columns of artillery; 7 fortress; 11 field, and 2 railway companies, 2 telegraph divisions, 3 bridging troops, 1 field park, and 2 searchlight sections of engineers; 41 companies of the army service corps; 83 infantry battalions; and nearly all the royal army medical corps. Beyond these there were 30 battalions of militia, 20 of imperial yeomanry, and 2 companies of Lord Lovat's scouts, besides colonial contingents from Australia, New Zealand, and Canada, and almost innumerable corps of various strengths provided by the South African colonies, horse and foot, including regiments which, by this time, are very much like regular corps, railway pioneer battalions, scouts, light horse, mounted rifles, town-guards, and rifle clubs.

With so many troops on war service the regular garrison at home at the time of enumeration was but 4 cavalry regiments, 11 horse and 66 field batteries, and 30 garrison companies of artillery; 22 companies and other details of the royal engineers; 20 ordinary infantry battalions (some of these under orders for South Africa, and others in process of formation), and 13 provisional battalions formed by the details of regiments serving abroad. The 4 cavalry regiments were supplemented by 7 provisional regiments composed of reserve squadrons of regiments on war service, and behind the comparatively small home force of regulars were the many brigades and battalions of militia, artillery, and infantry, all of which have recently had a long period of embodied training; the 48 regiments of imperial yeomanry formed, and a few more forming, and the great body of volunteers—artillery, engineers, and infantry—probably now approaching a total of 300,000, and, like the yeomanry, better trained and officered than at any former period.

India, at the beginning of the month, was credited with 5 cavalry regiments; 9 horse, 45 field, and 8 mountain batteries, and 24 garrison companies of artillery, and 47 infantry battalions, all British troops; Egypt had 1 cavalry corps, 1 field battery, 1 garrison company, and 3 infantry battalions; and in Malta, Gibraltar, and other dependencies there were 39 garrison companies, and 30 infantry battalions. Malta had, also 2 battalions of the specially formed royal garrison regiment, and Gibraltar 1, the fourth battalion, which was in process of formation, being at home. In all the colonies there were sufficient local regular and irregular corps to protect the territory of the empire notwithstanding the great demands which have everywhere been made for the South African campaign.—*London Times, December 26, 1901.*

ITALY.

MILITARY BUDGET FOR THE FISCAL YEAR BEGINNING JULY 1, 1901, AND ENDING JUNE 30, 1902, COMPARED WITH THAT OF THE PREVIOUS YEAR.

Ordinary expenditures.

Branch of the service.	1900–01.	1901–02.
	*Lire.**	*Lire.**
War ministry	2,494,540.00	2,487,940.00
Pensions	35,286,000.00	35,333,000.00
Staffs and inspection departments	3,909,600.00	3,930,700.00
Infantry	65,085,400.00	64,926,700.00
Cavalry	12,032,100.00	12,043,000.00
Artillery and engineers	23,717,700.00	23,654,200.00
Royal carbineers	26,400,100.00	26,400,100.00
Corps of invalids and veterans	171,900.00	176,600.00
Medical service	5,232,500.00	5,234,800.00
Commissariat, subsistence companies, and accountants in administrative departments	2,601,400.00	2,668,800.00
Military schools	2,468,000.00	2,367,100.00
Sum spent on pupils of military schools	300,000.00	260,000.00
Disciplinary companies and military penal establishments	989,700.00	1,005,500.00
Military geographical institute	490,100.00	452,600.00
Judge-advocate general's department	395,600.00	397,000.00
Allowances to officers in waiting, en disponibilité, or in auxiliary positions	852,500.00	702.500.00
Indemnities	4,119,000.00	4,155,000.00
Clothing and equipment	18,415,300.00	18,415,300.00
Provisions	13,330,600.00	13,676,600.00
Forage	17,149,200.00	17,476,800.00
Quarters	3,917,400.00	3,717,400.00
Keeping in repair of mobilization stores, etc	87.000.00	89,000.00
Remount service	4,628,000.00	4,564,000.00
Ordnance department	6,706,000.00	6,706,000.00
Engineer stores and works	5,574,600.00	5,554,600.00
Rent of real estate and water mains for military use	1,040,000.00	1,040,000.00
Expenses of military justice	27,000.00	27,000.00
Expenses for the Savoy and other military orders	110,500.00	110,500.00
Reimbursements for transfers and special missions	84,000.00	84,000.00
Expenses of litigation	39,000.00	59,000.00
Periodical bounties to engineer officers depending on the Henry legacy	1,260.00	1,260.00
National target practice	600,000.00	600,000.00
Total	258,256,000.00	258,317,000.00

Extraordinary expenditures.

Allowances to civilian employees en disponibilité and supernumerary	16,000.00	16,000.00
New military institutes and establishments	250,000.00	200,000.00
Fortifications and works of defense	6,000,000.00	3,860,000.00
Rent of government property in use in the service of governmental departments	6,637,677.73	6,848,532.14

---

* One lira equals $0.193.

Strength of the army according to the budget for 1901–02.

Branch of the service.	Officers.	Noncommissioned officers and men.
War ministry	65	
General staff and inspectorates	508	
Infantry (96 regiments infantry proper, 12 regiments bersaglieri, 7 Alpine regiments)	7,532	127,276
Cavalry (24 regiments)	1,061	21,400
Artillery (24 regiments field, 1 horse, 1 mountain, and 22 coast and fortress) Engineers (5 regiments, 1 railroad brigade)	2,399	33,808
Carbineers	595	24,317
Corps of invalids and veterans	11	160
Medical service	359	1,820
Commissariat	357	1,437
Military schools	315	1,111
Disciplinary companies and military penal establishments	84	1,737
Military geographical institute	15	
Military justice	16	
Unemployed, on leave, etc	145	
Total	13,462	213,066

Composition of the general staff and staff corps (in active service and unemployed) according to army list for 1902.

	Number.
General staff:	
Lieutenant generals	52
Major generals	92
Staff corps:	
Colonels	23
Lieutenant colonels	47
Majors	22
Captains	62

JAPAN.

Military budget for the fiscal year 1901–02.

ORDINARY EXPENDITURES.

		*Yens.**
War department		242,572
Army:		
Pay	10,242,559	
Office expenses	739,666	
Repairs on buildings	780,369	
Contingent fund	6,922	
Legal expenses	2,709	
Traveling expenses	1,199,100	
Miscellaneous	1,181,350	
Allowances	613,592	
Expenses of officers commissioned to foreign countries	109,138	
Provisions	7,562,516	
Clothing	4,111,822	
Arms and ammunition	3,490,722	
Horses	3,189,207	
Maneuvers	1,162,522	
Invalids	395,361	
Special expenses	895,571	
Allowances	70	
Convicts	44,622	
Military maps	6,545	
Special traveling expenses	1,215	
Transportation	515,231	
Secret expenses	121,600	
		36,372,409
Gendarmerie		1,121,191
Reserves		257,755
Expenses for memorial services		7,550
Total ordinary expenditures		38,001,477

---

*One yen equals $0.50.

Military budget for the fiscal year 1901–02—Continued.

EXTRAORDINARY EXPENDITURES.

Fortification	5,709,434
Construction and repairs	52,378
Surveys	248,922
Special expedition for construction of buildings	3,214,321
Manufacture of arms and ammunition	1,642,000
Bureau of construction	47,592
Pacification of insurgents in Formosa	50,000
Special corps	249,818
Post-bellum settlement of Chino-Japanese war	19,561
Compilation of history of Chino-Japanese war	50,831
Special rewards	270,000
Total extraordinary expenditures	11,554,857

COMPOSITION AND STRENGTH OF THE ARMY ACCORDING TO THE BUDGET OF 1901–02.*

The composition is as follows:

- Infantry, 52 regiments (156 battalions).
- Cavalry, 17 regiments (51 squadrons).
- Artillery—
  - 19 regiments field artillery and mountain artillery (114 batteries, 6-gun).
  - 6 regiments and 2 independent battalions fortress artillery.
- Engineers, 13 battalions sappers, 1 battalion railroad troops.
- Train, 13 battalions.
- Gendarmerie, 13 sections.

The numerical strength is as follows:

- Officers and employees, 8,116.
- Enlisted men, 135,533.
- Horses, 18,880.
- Guns, 456.

---

*From Rivista Militare Italiana, May, 1901.

MEXICO.

MILITARY BUDGET FOR THE FISCAL YEAR 1901–02 COMPARED WITH THE PREVIOUS YEAR.

Expenditures (including expenditures for the navy.)

Branch of the service.	Amounts (in Mexican money).	
	1900–01.	1901–02.
Office of secretary of war	$62,085.90	$59,335.75
General staff and dependencies	452,924.60	504,926.21
Military justice	474,252.90	469,075.40
Commandancias militares (military headquarters), jefaturas de zonas, de armas, forts and prisons	221,696.85	189,747.30
Department of engineers and dependencies	716,337.29	853,939.49
Department of artillery and dependencies	961,867.76	1,252,731.59
Bureaus of construction	257,125.75	----------
Medical corps and dependencies	478,158.04	480,261.53
Department of rolls and accounts and special services	----------	104,080.23
Department of infantry and dependencies	4,829,426.34	4,710,617.44
Department of cavalry and dependencies	2,325,445.46	2,418,172.85
Department of marine and dependencies	893,052.20	900,355.05
General expenses	1,460,000.00	1,580,000.00
War expenses in Yucatan	500,000.00	500,000.00
Total	13,632,373.09	14,023,242.84

Peace strength of the army.

Arm of the service.	Officers.	Noncommissioned officers and men.
Infantry (28 battalions, 4 skeleton battalions, 2 regional companies)	850	18,116
Cavalry (14 regiments and 4 skeleton regiments)	364	6,938
Artillery (2 regiments field artillery, 1 regiment mountain artillery, 1 regiment horse artillery, 1 machine-gun company, and 1 squadron small-caliber rapid-fire guns)	128	2,079
Engineers (1 battalion of sappers of 4 companies)	34	807
Transport service (1 squadron of 2 companies)	9	119
Medical corps	140	281
Military gendarmery (1 squadron)	5	116
Veterinary corps	19	----------
Total	1,549	28,456

COMPOSITION OF THE GENERAL STAFF.

The number of officers in the general staff in peace or war is not fixed, but will depend upon the exigencies of the service according to the judgment of the war department, it being taken into consideration that there should always be enough officers to supply four divisions over and above the number necessary in the geographical service.

The grades in the general staff are colonel, lieutenant-colonel, major, first and second captain, and lieutenant.

NETHERLANDS.

Military budget for 1902 compared with amounts appropriated for 1901.

Sections.	Branch of the service.	1902.	1901.
		*Florins.**	*Florins.**
I	Expenses of the war department	166,250.00	162,650.00
II	Salaries and allowances, together with indemnities for changes in uniform and for loss of baggage, for the purchase and loss of service horses, and for quarters in garrison, of the great general staff, the general staff, the intendance department, and the provincial and local staffs	259,700.00	249,100.00
III	Salaries, allowances, and indemnity for changes in uniform and loss of baggage, for the purchase and loss of service horses, and for quarters in garrison, of the staffs of the various arms and of line officers; indemnity for the repair of officers' bicycles; allowances to reserve officers for the first purchase of uniform; and daily wages of military watchmen	3,235,864.00	3,212,449.00
IV	Pay and other expenses of the various staffs, departments, and arms of the service mentioned in sections II, III, and V, except the costs mentioned in sections IX and XII, including, however, the expenses of instructors below the rank of officer in the militia and volunteer drill assemblies and volunteers of the reserve cadre	7,453,318.00	6,762,987.00
V	Medical service	836,035.00	832,363.00
VI	Study and instruction	412,644.00	377,656.00
VII	Ordnance department	2,120,920.00	2,255,885.00
VIII	Engineer service	954,070.00	948,320.00
IX	Commissary department	2,698,261.00	2,429,693.00
X	Clothing and equipment	583,705.00	465,350.00
XI	Topography and reconnoissance service	71,028.00	66,830.00
XII	Transportation of personneland material	334,900.00	331,900.00
XIII	Various expenditures	92,965.00	94,908.40
XIV	Pay of noncombatants, pension, etc	2,576,339.00	2,558,319.00
XV	Unforeseen expenditures	50,000.00	50,000.00
XVI	The Maréchaussée	799,752.00	784,465.00
XVII	Extraordinary expenditures	358,990.00	492,440.00
XVIII	Completion of the system of fortification	948,700.00	850,000.00
	Total	23,953,441.00	22,925,315.40

* One florin equals $0.402.

In peace the total number of the army was, on June 1, 1899, 25,066 men and about 1,919 officers.

Included in the infantry are 1 regiment of guards, and 8 regiments of the line; there are 3 regiments of cavalry, 1 battalion of sappers and miners, 3 regiments of field artillery, 4 of fortress artillery, 1 corps of light horse artillery, 1 corps of pontoniers, and 1 corps of torpedoists.—*Statesman's Year-Book.*

The normal establishment of the colonial army of Dutch East Indies, on the first of January, 1900, consisted of 39,388 noncommissioned officers and enlisted men and 1,345 officers, not including 221 officers on leave in Europe.

Composition of the general staff according to the Dutch army list for 1902.

Lieutenant general, chief	1
Major generals	2
Colonel	—
Lieutenant colonels	7
Major	1
Captains	17

NORWAY.

Military budget for 1901–02 compared with the previous year.

[Reported by Lieut. Col. W. R. Livermore, Corps of Engineers, United States Military Attaché at Copenhagen and Stockholm.]

Branch of the service.	1901–02.	1899–01.
Pay and allowances:	*Crowns.**	*Crowns.**
Army administration	68,700	67,800
General staff	100,500	74,300
Engineers	194,600	174,800
Artillery:		
Field artillery	341,100	297,900
Coast artillery	528,700	305,000
Technical artillery (ordnance department)	199,800	188,400
Cavalry	215,600	197,900
Guards	55,900	53,300
Infantry	1,692,900	1,566,200
Medical corps	197,900	189,100
Veterinary corps	35,400	34,000
Intendancy	122,000	120,400
Train	62,200	58,000
Military justice	25,000	16,400
Recruiting service	38,200	38,200
Fortress officers and servants	7,800	10,000
Extra age allowances	413,300	406,700
Extra pay	63,200	68,400
Landsturm	59,200	83,400
Introduction of conscription in Tromsö	416,000	441,700
Educational institutions	1,110,700	984,200
Drills and maneuvers	950,600	927,100
Maintenance, subsistence, and equipment	5,206,500	4,473,800
Engineer department (fortifications and drill grounds)	488,600	313,700
Miscellaneous	608,300	575,200
Extraordinary	446,100	483,400
Total	13,648,800	12,149,300

* One crown equals $0.268.

COMPOSITION OF THE NORWEGIAN ARMY IN 1901.

General staff, war school, military high school.

Engineers:
- 1 corps of 1 line battalion and 1 landwehr battalion.

Artillery:
- 3 field-artillery corps of 1 line battalion and 1 landwehr battalion each.
- Mountain artillery corps of 1 line battalion and 1 landwehr battalion.
- Coast artillery, 4 fortification battalions.

Cavalry:
- 3 corps of 3 line squadrons and 3 landwehr squadrons each and 1 orderly squadron.

Infantry:
- 5 brigades of 4 line and 4 landwehr battalions each.
- The king's Norwegian bodyguard (2 companies).
- 2 cyclist companies.
- Tromsö diocese defense force.

Sanitary corps.

Veterinary corps.

Train corps.

Composition of the general staff.

Major general, chief	1
Lieutenant colonels	4
Captains	9
Assistant captains	9
Aspirants (captains and lieutenants)	12
Noncommissioned staff	10

Peace strength of line and landwehr, 1901.

Branch of the service.	Permanent.		Subject to call.	
	Officers.	Noncommissioned officers and enlisted men.	Officers.	Noncommissioned officers and enlisted men.
Army administration	10	6		
General staff	18	10		
Engineers	39	142		1,338
Field artillery	62	347	25	3,222
Coast artillery	79	660	45	1,970
Technical artillery (ordnance)	16	104		
Cavalry	46	179	7	1,863
Guard	8	207		
Infantry	380	1,702	335	24,180
Sanitary service	65	70	14	500
Veterinary service	18			
Intendance	23	29		
Train	13	49	1	578
Troms i defense	14	204	16	1,400
Army educational establishment	56	1,887	9	56
Total	847	5,596	452	35,107

PORTUGAL.

Military budget for 1901-02 compared with that for 1900-01.

Branch of the service.	1901-02.	1900-01.
ORDINARY EXPENDITURES.	*Milreis.**	*Milreis.**
War Ministry	21,222.370	21,074.970
Great general staff and military household of the King	41,964.000	41,904.000
General and headquarters staffs and governments of fortifications	72,193.500	71,811.500
Pay and allowances of the army	2,342,966.050	2,354,193.157
Pay of noncombatant officers	265,687.200	252,852.500
Administrative and medical services and various establishments	500,771.436	369,140.145
Military instruction	168,689.150	163,499.700
Military justice and establishments connected therewith	33,233.115	37,448.485
Auxiliary cadres and inactive personnel	904,593.676	856,914.545
Provisions and forage	1,238,995.585	1,236,274.820
Clothing	224,444.625	226,119.975
Miscellaneous expenditures	304,798.700	301,132.100
Expenditures for expired fiscal years	12,614.660	16,300.000
Total ordinary expenditures	6,132,174.067	5,948,665.897
Increase	183,508.170	
EXTRAORDINARY EXPENDITURES.		
Construction of defensive works of Lisbon and harbor	100,000.000	50,000.000
Construction and enlarging of quarters of other military buildings	30,000.000	30,000.000
Payment on the Royal Military College property	2,038.019	2,038.019
Total extraordinary expenditures	132,038.019	82,038.019
Increase	50,000.000	

*One milreis equals $1.08.

Budgetary strength for 1901-02 according to law of September 7, 1899.

Branch of the service.	Officers.	Noncommissioned officers and men.
1 regiment of engineers	48	795
Artillery (4 regiments field artillery, 2 batteries each of horse artillery and mountain artillery, and 2 regiments of garrison artillery)	298	4,419
8 regiments of cavalry	276	4,020
Infantry and chasseurs (including reserves), 27 regiments of infantry and 4 of chasseurs	1,172	20,209
Train	4	126
Subsistence company	3	273
Medical company	3	158
Total	1,804	30,000

Composition of the general staff.

	Number.
Great general staff:	
Marshal of the army	1
Generals of division	6
Generals of brigade	20
Staff service:	
Colonels	6
Lieutenant colonels	6
Majors	6
Captains	20
Lieutenants	10

RUSSIA.

Military budgets for 1902 and 1901.

[REPORTED BY CAPT. S. L'H. SLOCUM, EIGHTH CAVALRY, U. S. MILITARY ATTACHÉ AT ST. PETERSBURG.]

Branch of service.	1902.	1901.
	*Rubles.**	*Rubles.**
Central administration	2,833,347	2,740,841
Local administration	9,880,397	9,372,308
Technical services and schools	10,106,670	9,769,474
Medical service and hospitals	4,380,077	4,535,813
Clothing and equipment	20,448,496	25,003,068
Rations	48,701,738	46,471,220
Forage	18,972,601	18,618,021
Pay	71,903,470	72,406,378
Rent and maintenance of buildings	22,133,930	21,180,774
Constructions	24,553,559	25,349,968
Manufacture of guns and ordnance material; improvements	12,776,374	6,000,355
Field, artillery, and fortress artillery; target practice	2,965,084	2,838,216
Transportation, traveling expenses, couriers, dispatches	11,357,047	10,993,373
Recruiting	1,480,895	1,424,038
Drills of reserve troops and militia	2,647,306	2,883,097
Expenses of the governorship general of Turkestan	1,404,453	1,387,554
Special corps of gendarmery	4,943,878	3,962,020
Rewards and relief fund	4,111,333	3,887,935
Sums to be turned into the retirement fund, together with government grants to said fund	5,391,674	5,421,188
Extraordinary expenditures	612,243	612,726
Peninsula of Kwangtung	7,088,539	7,340,721
Rearmament	17,887,610	24,230,133
Miscellaneous expenses	2,755,211	2,675,342
Reserve fund	4,707,606	6,325,308
Credit for the needs of 1903	8,595,000	8,595,000
Total	322,638,538	324,024,871

* One ruble equals $0.515.

Normal peace strength of the Army in 1902.

Arm of the service.	Officers.	Men.
Infantry:		
5,826 companies, including 5 machine-gun and 21 disciplinary companies	24,176	662,388
Cavalry:		
467 squadrons and 323 sotnias	5,171	127,772
Artillery:		
479 foot batteries	5,978	161,585
50 horse batteries		
30 howitzer batteries		
20 mountain batteries		
5 sortie batteries		
78 flying parks		
Engineers, etc.:		
95 field sapper and 13 fortress sapper companies	1,307	33,912
28 companies and 1 detachment field telegraph and 7 detachment fortress telegraph troops.		
16 pontoon companies		
35 railroad companies		
7 field engineer and 2 fortress engineer parks		
14 submarine-mining companies (of which 2 are river submarine)		
6 balloon detachments		
1 instructional balloon park		
Corps military topographers		
Local troops	880	4,627
Fortress gendarmerie	19	335
Hospitals	6	8,627
Clergy		498
Prisons	67	110
Military school office	115	2,106
Minister of war	88	75
There are in addition to the normal strength	605	*74,423
Grand total	38,412	1,076,458
The above is inclusive of the Kwangtung troops of	318	15,606

*Of which about 10,000 are artillery and the remainder infantry.

Besides these troops of the active army there are the following:

Gendarmerie		15,000
Frontier guards		35,000
Manchuria railway guards		16,000
Recruits drawn for 1902		305,245
Officers passing from the active army to the reserves		625
Opolchenie or militia:		
Infantry	companies	1,280
Cavalry	squadrons	80
Artillery	batteries	40
Officers of the general staff:		
Generals		53
Lieutenant generals		107
Major generals		121
Colonels		223
Lieutenant colonels		177
Captains		267

MILITARY DISTRICT, ST. PETERSBURG.

Guard corps; headquarters, St. Petersburg.
First army corps; headquarters, St. Petersburg.
Eighteenth army corps; headquarters, Dorpat.

MILITARY DISTRICT, FINLAND.

(Headquarters, Helsingfors.)

Two independent infantry brigades, Russian.
Fifty-fifth regiment of dragoons, Russian.

MILITARY DISTRICT, VILNA.

Second army corps; headquarters, Grodno.
Third army corps; headquarters, Vilna.
Fourth army corps; headquarters, Minsk.
Sixteenth army corps; headquarters, Vitebsk.
Twentieth army corps; headquarters, Riga.

MILITARY DISTRICT, WARSAW.

Fifth army corps; headquarters, Warsaw.
Sixth army corps; headquarters, Warsaw.
Fourteenth army corps; headquarters, Lublin.
Fifteenth army corps; headquarters, Warsaw.
Nineteenth army corps; headquarters, Brest-Litovsk.
First cavalry corps; headquarters, Warsaw.
Second cavalry corps; headquarters, Warsaw.

MILITARY DISTRICT, KIEF.

Ninth army corps; headquarters, Kief.
Tenth army corps; headquarters, Kharkof.
Eleventh army corps; headquarters, Rovno.
Twelfth army corps; headquarters, Vinnitza.
Twenty-first army corps; headquarters, Kief.

MILITARY DISTRICT, ODESSA.

Seventh army corps; headquarters, Simferopol.
Eighth army corps; headquarters, Odessa.

MILITARY DISTRICT, MOSCOW.

Grenadier corps; headquarters, Moscow.
Thirteenth army corps; headquarters, Smolensk.
Seventeenth army corps; headquarters, Moscow.

MILITARY DISTRICT, KAZAN.

Orenburg Cossacks; headquarters, Orenburg.
Ural Cossacks; headquarters, Uralsk.
Astrakhan Cossacks; headquarters, Astrakhan.

MILITARY DISTRICT OF THE DON.

Don Cossacks; headquarters, Novocherkask.

MILITARY DISTRICT OF THE CAUCASUS.

(*Headquarters, Tiflis.*)

First Caucasian army corps; headquarters, Alexandropol.
Second Caucasian army corps; headquarters, Tiflis.
Kuban Cossacks; headquarters, Ekaterinodar.
Terek Cossacks; headquarters, Vladikavkaz.

MILITARY DISTRICT, TURKESTAN.

(*Headquarters, Tashkent.*)

First Turkestan army corps; headquarters, Tashkent.
Second Turkestan army corps; headquarters, Askabad.

MILITARY DISTRICT, SIBERIA.

(*Headquarters, Omsk.*)

Thirteen battalions; headquarters, Omsk.

MILITARY DISTRICT OF THE AMUR.

(*Headquarters, Khabarovka.*)

First Siberian army corps; headquarters, Nikolsk-Usurisk.
Second Siberian army corps; headquarters, Khabarovka.
Transbaikal Cossacks; headquarters, Chita.
Amur Cossacks; headquarters, Blagoveshchensk.
Usuri Cossacks; headquarters, Vladivostok.

MILITARY DISTRICT, KWANGTUNG.

(*Headquarters, Port Arthur.*)

Sixteen battalions; headquarters, Talienwan and Port Arthur.

SPAIN.

Military budget for 1901.

		Amounts asked for 1901.	Amounts granted for 1900.
Personnel:			
Central administration—	*Pesetas.**	*Pesetas.**	*Pesetas.**
Minister of war	30,000.00		
War ministry and its dependencies	2,154,197.00		
Supreme council of war and navy	436,811.00		
Consultative military board	394,058.00		
		3,015,066.00	2,982,948.00
Great general staff		3,110,063.00	3,357,628.00
Territorial commands and special services—			
Personnel of captaincies general, general and military governorships and headquarters, and the various troops serving in the districts	10,332,575.00		
Personnel detailed for duty away from their arms, or for special services	1,758,550.00		
		12,091,125.00	11,841,190.00
Army—			
Army proper and auxiliary forces	56,687,625.00		
Recruiting	100,000.00		
Military instruction	2,812,007.00		
Veteran corps and soldiers' home	1,046,352.00		
		60,645,984.00	57,088,819.58
Penal establishments		122,740.00	123,915.32
Military orders with pensions for rewarding special merits		548,595.00	295,210.00
Bounties for enlistment and reenlistment		1,450,000.00	1,450,000.00
		80,983,573.00	77,089,710.90
Material:			
Central administration—			
Expenditures of the war ministry and its dependencies	293,600.00		
Expenditures of the supreme council of war and navy	22,500.00		
Expenditures of the consultative military board	17,500.00		
		333,600.00	333,600.00
Territorial commands and special services—			
Expenditures of captaincies general and general and military governorships and headquarters	230,705.00		
Expenditures of district offices, establishments, and dependencies	133,883.00		
		364,588.00	362,957.00
Army—			
Subsistence	15,969,656.00		
Quarters, lighting, and heat	2,372,215.00		
Camps	50,000.00		
Hospitals	2,737,821.00		
Transportation	1,031,000.00		
Remounts and horse raising	2,381,727.00		
Artillery material	6,400,000.00		
Engineers' material	5,250,000.00		
Purchase of material for the general headquarters, the regimental trains, and the administrative and the medical services	405,223.00		
		36,597.642.00	33,946,517.18
Rent of buildings for military uses		341,268.00	308,607.75
Various and unforseen expenses		310,000.00	310,000.00
		37,947,098.00	35,261,681.93
Expenditures to be defrayed by a sinking fund:			
Personnel—			
Reserves	11,711,655.00		
Supernumeraries and substitutes	8,537,053.00		
Liquidating commission for the colonies—Personnel	3,113,562.00		
Military orders with pensions for service in war	3,064,613.00		
		26,426,883.00	25,702,135.00
Material—			
Expenditures of the liquidating commission for the colonies		112,640.00	126,840.00
		26,539,523.00	25,828,975.00
Previous fiscal years:			
Obligations for which no appropriations were provided		3,523,465.53	1,343,515.00
Additional items		Nil.	26,450,447.82

* One peseta equals $0.193.

Military budget for 1901—Continued.

RECAPITULATION.

	Amounts asked for 1901.	Amounts granted for 1900.
	Pesetas.	*Pesetas.*
Personnel	80,983,573.00	77,089,710.90
Material	37,947,098.00	35,261,681.93
Expenditures to be defrayed by a sinking fund	26,539,523.00	25,828,975.00
Previous fiscal year's obligations	3,523,465.53	1,343,515.00
Additional items*	----------	26,450,447.82
	148,993,659.53	165,974,330.65
Decrease	16,980,671.12	

*The additional items in 1900 include the appropriations for the civil guard and the reenlistment bounties of marine infantry; these items are now provided for in the budgets of other departments.

Strength of the Spanish Army.†

	Officers.	Enlisted men.	Total.
Army proper:			
Generals	275	----------	275
General staff corps	244	----------	244
Royal corps of halberdiers	39	255	294
Squadron of royal bodyguard	16	150	166
Infantry	7,319	45,581	52,900
Cavalry	1,679	12,388	14,067
Artillery	1,260	12,834	14,094
Engineers	573	4,277	4,850
Civil guard	1,033	17,558	18,591
Carabineros (custom-house guard)	631	14,171	14,802
Volunteer militia of Ceuta—			
Infantry	----------	59	59
Cavalry	----------	60	60
Company of marines	----------	59	59
Company of marines, Melilla	----------	90	90
Fortress staff corps	41	----------	41
The train	8	----------	8
Corps of veterans	145	507	652
	13,263	107,989	121,252
Auxiliaries:			
Military justice	107	----------	107
Chaplains	355	----------	355
Administrative service	982	1,460	2,442
Sanitary service—			
Surgeons	621	----------	621
Pharmaceutists	138	----------	138
Veterinaries	216	----------	216
Military equitation corps	76	----------	76
Military offices	350	----------	350
Brigade of workers and topographers of the general staff	14	386	400
Hospital brigade	40	881	921
Fortress wardens	112	----------	112
	3,011	2,727	5,738
Grand total	16,274	110,716	126,990
Reserve officers	8,485	----------	8,485

† Anuario militar de España, 1901.

Number of horses and mules in the Spanish army.‡

Royal guard	135
Infantry	596
Cavalry	11,008
Artillery	3,849
Engineers	315
Administrative, medical, and other services	700
Total	16,603
Number of guns ‡	272

---

‡ Von Löbell's Jahresberichte, 1900.

COMPOSITION OF THE SPANISH ARMY.*

Infantry:

64 regiments, having each 2 four-company battalions; armed with Mauser, model 1893, caliber 7 millimeters. Strength of 1 battalion: Peace—23 officers and 326 enlisted men; war—27 officers and 1,000 men.

57 regiments of reserve.

20 battalions of rifles. Strength of 1 battalion: Peace—23 officers and 716 enlisted men; war—27 officers and 1,001 men.

Cavalry:

28 regiments. Strength of 1 squadron: Peace—5 officers and 100 enlisted men; war—5 officers and 150 enlisted men.

14 regiments of reserve.

Artillery:

17 regiments of field and mountain artillery, each regiment consisting of 4 batteries. Strength of 1 battery—4 officers, 71-98 enlisted men; 6 guns.

10 six-company battalions of fortress artillery. Strength of 1 company—4 officers and 88 enlisted men.

1 regiment of siege artillery.

4 companies of artillery workers.

8 depots of reserve artillery.

Engineer troops:

4 regiments of sappers.

1 regiment of pontoniers.

1 railway battalion.

1 telegraph battalion.

1 balloon company.

1 brigade of topographers.

1 company of engineer workers.

8 depots of reserve engineer troops.

Administrative troops:

16 companies.

Hospital corps:

19 companies.

Strength and composition of the general staff of the Spanish army on January 1, 1901.†

Colonels	33
Lieutenant colonels	64
Majors	77
Captains	70
Total	244

---

*Almanach de Gotha, 1901.

†Anuario militar de España, 1901.

SWEDEN.

Military budget, according to the law of reorganization for 1902.

[FROM REPORT OF LIEUT. COL. W. R. LIVERMORE, CORPS OF ENGINEERS, UNITED STATES MILITARY ATTACHÉ AT COPENHAGEN AND STOCKHOLM, AND THE OFFICIAL BUDGET.]

	*Crowns.**
Pay and allowances:	
General staff	287,767.50
Infantry	6,457,043.90
Cavalry	2,041,700.70
Artillery	2,363,912.25
Fortress troops	640,478.00
Train	605,613.00
Other services	1,223,850.14
Increased pay for conscripts	10,301,134.00
Pay for volunteers attached	
Remount service	1,484,128.00
Schools for officers, noncommissioned officers, and surgeons	426,280.00
Subsistence in kind, hospital, drills, and material	13,663,626.51
Diminution of taxes and allowances to holders of estates	4,465,900.00
Various expenditures	104,700.00
Total	44,066,134.00

Peace strength of the army according to the law of 1901.

Arm of the service.	Officers.	Noncommissioned officers and enlisted men.
Generals	17	
General staff	51	
Infantry (28 regiments)	1,293	26,959
Cavalry (8 regiments)	264	5,470
Artillery (8 regiments, 1 corps)	606	7,249
Engineers (2 battalions, 8 companies)	128	1,706
Train (6 corps)	90	924
Total	2,449	42,308

Composition of the general staff.

Lieutenant general, chief	1
Colonels	4
Lieutenant colonels	4
Majors	12
Captains	20
Lieutenants	10

---

*One crown equals $0.268.

SWITZERLAND.

[REPORTED BY MAJ. G. R. CECIL, THIRD INFANTRY, UNITED STATES MILITARY ATTACHÉ AT BERN.]

Military budget for year ending December 31, 1901.

	Francs.	Francs.
I. Secretary's office		66,500
II. Administration:		
A. Personnel of administration	846,845	
B. Personnel of instruction	1,356,661	
C. Instruction	12,433,507	
D. Clothing	3,654,245	
E. Armament and equipment	2,081,015	
F. Indemnities to officers for equipment	497,017	
G. Cavalry horses	2,432,459	
H. Subsidies to shooting societies	1,003,100	
I. War material	1,635,636	
K. Military establishments and fortifications	370,350	
L. Fortifications	1,041,504	
M. Topographical office	331,133	
N. Allowances of pay after death	25,000	
O. Commissions and experts	15,000	
P. Printing	120,000	
Q. Landsturm	32,000	
R. Cost of administration and care of wheat	35,000	
S. Allowances for horse depot	61,451	
T. Insurance against accidents	80,000	
U. Unforeseen expenses	2,500	
		28,054,423
Total		*28,120,923
III. Powder works		1,431,600
IV. Horse depot		616,451
V. Construction shops		454,200
VI. Manufacture of munitions		3,778,000
VII. Manufacture of arms		1,809,000
		*8,089,251

The organic laws of the Republic forbid the maintenance of a standing army within the limits of the Confederation. All able-bodied men between the ages of 17 and 50 years are held to military service, out of which there is maintained a militia well organized, armed, and equipped, subject at all times to the call of the Confederation. Until 1874 the organization and training of the militia were left entirely to the cantons; the results, however, not giving satisfaction, these powers have since that date been gradually transferred to the Confederation, and the powers of the cantonal governments correspondingly diminished. The Confederation now enacts all military laws and provides for their enforcement; it at the same time provides for the expenses of the military establishment in all their essential features. All male citizens of military age being held to service; those who do not serve, including those physically disabled, are required to pay a military tax, not only upon the property they possess, but upon their probable inheritance. Half this tax goes to the cantons and the other half to the Confederation. There are, however, a few exceptions to this rule that apply during the period of their employment, such as members of the Federal Council, the clergy, teachers, certain employees of the post office, telegraphs, railroads, hospitals, etc. The tax is heavy, and men generally prefer to serve rather than to pay it.

---

*The items III, IV, V, VI, VII, amounting to 8,089,251 francs, are offset by the receipts from the products of these five establishments, leaving the net expenses of the military department of Switzerland 28,120,923 francs for the fiscal year ending December 31, 1901.

The service is divided according to age into three classes: The élite, which includes in general those between 20 and 32 years of age; the landwehr, those between 33 and 44 years, inclusive, which is further subdivided into the "first ban," including those from 33 to 39 years of age, and the "second ban," those from 40 to 44; the landsturm, called out only in cases of emergency, includes all other male citizens between the ages of 17 and 50 years. Officers may be held to a still greater age.

The powers of the Confederation, represented by the Federal Council, are administered through one of its members designated as "chef du département militaire," or secretary of war. In the military department function a number of superior officers who conduct the affairs of their several departments or bureaus. Among these are the chiefs of infantry, cavalry, artillery, engineers of the staff, of the bureau of topography, etc. To each chef d'arme is added a chief instructor, who replaces him in case of absence, and a certain number of the corps of instructors.

Ten years ago there was organized a commission for the national defense, with the chief of the military department as president, and the four army corps commanders, the chief of infantry, the chief of the general staff, and the commandant of the fortifications of St. Gothard as members. To it are referred all matters relating to the national defense and from it are expected plans for campaigns, etc.

ORGANIZATION.

The peace organization of the army consists of four army corps and the defences of St. Gothard and St. Maurice. Each corps is composed of 2 infantry divisions of 2 brigades and 1 rifle battalion each; 1 brigade of cavalry with a Maxim company attached; 14 batteries of field artillery (4 batteries to each division, and 6 batteries corps artillery); 3 half battalions of engineers; the necessary sanitary troops and troops of administration. There are in all 96 battalions of infantry and 8 rifle battalions in the élite. Two of the battalions of infantry have recently been organized. A regiment of infantry has usually 3 battalions of 4 companies each.

A brigade of cavalry is composed of 2 regiments of 3 squadrons each; in addition, serving with the cavalry of each corps, unless detached for orderly or escort duty, are 3 companies of guides, organized the same as the squadrons of dragoons; also 1 mitrailleuse company armed with 8 Maxim guns.

Strength January 1, 1901.

	Élite.	Landwehr.		Total.
		First ban.	Second ban.	
Staff	1,018	269	52	1,339
Infantry	114,843	40,840	21,059	176,742
Cavalry	4,641	3,433		8,074
Artillery	20,113	11,174	2,403	33,690
Engineers	5,507	4,461		9,968
Sanitary troops	4,940	2,912	718	8,570
Administration troops	1,444	825	29	2,298
Bicyclists	278	89		367
Total	152,784	64,003	24,261	241,048
Officers awaiting assignment				400
Staffs and officers of territorial and camp service				495
Grand total				241,943

RECRUITING.

For purposes of recruiting the country is divided into eight arrondissements, corresponding to the eight infantry divisions. During the year in which a young man becomes 20 years of age he is notified to present himself for examination, and, if found qualified, to report for duty at some one of the recruit schools, where he is uniformed, armed, and equipped, and put through a rigid course of instruction for the allotted time—for infantry, forty-six days; for artillery, fifty-six days; for cavalry, eighty days; for engineers, fifty days.

These schools are conducted by officers of the corps of instructors, aided by cadres called to service some days in advance of the assembling of the recruits. This corps has an authorized strength of 218 instructors, and they are the only officers kept constantly employed in a strictly military capacity. When they are not engaged at the recruit schools, or with troops during their cours de répétition or maneuvers, work is found for them at the schools for officers and noncommissioned officers.

The following table shows the results of the recruiting during the year 1900:

	Accepted.	Held over one year.	Rejected.	Total.
Born in 1881	13,473	4,465	8,337	26,275
Held over from previous years	2,761	1,252	2,818	6,831
Totals of recruits	16,234	5,717	11,155	33,106

The 16,234 recruits accepted were passed through the recruit schools and embodied in the élite from January 1, 1901, being 892 less than in the previous year.

APPOINTMENTS OF OFFICERS AND NONCOMMISSIONED OFFICERS.

The noncommissioned officers are appointed by the battalion commanders upon the recommendation of the captains, but they must demonstrate their capacity at a special school for under-officers before they are confirmed in their positions. These school terms are thirty days for infantry, thirty-seven days for artillery, and forty-four days for cavalry. By a provision of law every citizen is obliged to accept any grade conferred upon him.

As a general rule all officers must have served in the ranks and as noncommissioned officers, the principal exceptions being officers of artillery and engineers, graduates of the military section of the École Polytechnique at Zurich, who, if they fulfill the other conditions, may be appointed to the grade of first lieutenant.

Candidates for the lowest commissioned grades are chosen according to arm from the noncommissioned officers who have passed through the school for underofficers and have done duty as noncommissioned officers at a school of recruits. Their aptitude being demonstrated they are designated by the chef d'arme and sent forward to an aspirants' school for forty-four days for infantry; for cavalry, sixty-two days; for artillery, two courses, the first of forty-four days, and the second of sixty-five days for those who have successfully passed the first course; for engineers the course is sixty-five days.

Those who successfully pass these schools are then appointed second lieutenants.

For advancement to the grade of first lieutenant they must in addition have obtained certificates of proficiency as lieutenants in the following schools:

Infantry: One school of rifle practice; one school of recruits; two cours de répétition.

Cavalry: One school of recruits; three cours de répétition.

Artillery: One school of recruits; one cours de répétition.

Engineers: One school of recruits: one cours de répétition.

One special course.

For captain:

Infantry: One course at École Centrale for officers; one school of recruits as company commander; two cours de répétition and to have served at least three years as first lieutenant.

Cavalry: École des cadres; one school of recruits as squadron commander; three cours de répétition.

Artillery: One course at École Centrale; one school of recruits as battery commander; two cours de répétition; and to have been at least two years in the grade of first lieutenant.

Engineers: One course at École Centrale; one school of recruits as company commander; one cours de répétition.

Promotions to major and lieutenant colonel are made from the grade next below after passing successfully courses of instruction similar to the foregoing but more advanced, so as to determine fitness for the duties of the proposed grade.

There are four of these École centrales:

The first is annual for forty-two days, for subalterns of all arms; the second is annual for forty-two days for captains newly promoted and for those proposed for major; the third is held three out of every four years, for twenty-one days, for battalion commanders of infantry; the fourth is held once in every four years, in the years when the third school is not held; for twenty days for lieutenant colonels newly promoted.

Vacancies are filled in the lowest grade of the staff proper (captain) by careful selection among the captains and lieutenants of the line, and those selected aro required to do duty and become familiar with the arms other than that from which they came. Special schools are provided for their instruction and various methods are taken to test their efficiency.

Appointments and assignments of colonels in the line or staff are made by selection. Colonel is the highest grade in the Swiss army in time of peace. Brigade, division, and corps commanders are designated "colonel brigadier," "colonel divisionaire," and "colonel commandant de corps d'armée."

It will be seen that great care is exercised in providing officers for this force and therein undoubtedly lies its strength.

For the men in the ranks after they have passed through their recruit schools, little more is required. During the time passed in the élite (twelve years for all arms except cavalry, which is ten years) the men are called out for exercises, called "cours de répétition," for the infantry every two years for eighteen days; for field artillery every two years for twenty days; for siege and fortress artillery every two years for eighteen days; for cavalry, every year for twelve days but for ten years only.

This time is short and many officers think it should be extended, but it serves to keep the men in touch with their work, which is limited to the essentials. No time is given to display and the tactics are as simple as it is possible to make them.

II.—ORGANIZATION.

The following notes give outlines of some recent changes in organization in foreign armies.

The organizations of various foreign armies up to 1896 may be found in M. I. D. pamphlet No. VIII, entitled Notes on Organization, Armaments, and Military Progress.

ARGENTINA.

EXTRACT FROM A DECREE OF DECEMBER 31, 1900, BY THE PRESIDENT OF THE REPUBLIC, REORGANIZING THE ARMY.

ARTICLE 1. The department of war will comprise the following divisions:

1. A military cabinet.
2. A central administration.
3. The great general staff of the army, by means of which the secretary of war will command, administer, and prepare the army for war.

ART. 2. The three above-mentioned divisions will each be commanded by a superior officer, bearing respectively the titles of chief of the military cabinet, chief of the central administration, and chief of the great general staff of the army.

I.—MILITARY CABINET.

The military cabinet, the executive branch, which furthermore is charged with the business affairs of a military nature, will comprise the following sections:

First section: The secretary's office, which attends to the correspondence, transmission of orders, and military bulletin.

Second section: Organization, recruiting, and movement of troops.

Third section: Instruction, regulations, and military schools.

Fourth section: Direction of the infantry.

Fifth section: Direction of the cavalry.

Sixth section: Direction of the artillery and engineers.

Seventh section: War arsenals, powder factories, material, etc.

Eighth section: Military construction.

Ninth section: Sanitary and veterinary service.

Tenth section: Remount service.

Eleventh section: Military justice and military chaplaincy.

Twelfth section: Army lists, army books, archives, and library.

II.—CENTRAL ADMINISTRATION.

The central administration shall have under its charge all that which relates to the general administration of the army and shall comprise the following sections:

First section: The administrative secretary's office.

Second section: Estimates or budgets, accounts, and disbursements.

Third section: Military intendance and control of the administration of the army.

Fourth section: Retirements, reforms, pensions, etc.

III.—GREAT GENERAL STAFF OF THE ARMY.

The great general staff shall have under its charge all that which concerns the preparation of the army for war. It shall comprise the following six divisions:

First division: Mobilization and concentration.

Second division: Military operations, study of the probable theater of operations, staff journeys, grand maneuvers, and superior war school.

Third division: Military geographical institute, geodesy, topography, cartography, and archives of maps and charts.

Fourth division: Transportation of troops, military communications.

Fifth division: Service of information, statistics, military reconnoissance, study of foreign armies, missions to the exterior (attaché service, etc.).

Sixth division: Military history of the republic, archives of the general staff, library.

ART. 3. In addition to the three branches or departments above indicated there shall be created a department belonging to the minister of war and called "Secretaria del Ministro," which shall have under its charge the transaction of business of a special nature determined by the minister of war.

ART. 4. All other decrees and regulations now in force contrary to the present decree shall be and are hereby abrogated.

ART. 5. To be promulgated, published, and inserted in the national register (registro nacional).—*Enciclopedia Militar, January and February, 1901, Buenos Ayres.*

BRAZIL.

REORGANIZATION OF THE BRAZIILAN ARMY.

The constitution of the United States of Brazil says:

The ranks of the army and navy shall be filled by volunteers without bounty, and if a sufficient number does not volunteer, the deficiency shall be completed by drafting, which shall be regulated by law.

The Brazilian Senate has approved a law relative to drafting. Every Brazilian from 19 to 40 years of age is subject to military service. Military service ordinarily comprises three years in the active army and three years in the reserve. In time of peace the Brazilians will be subject to drafting betweeen the ages of 19 and 30 years; in time of war between the ages of 19 and 40 years.

When the contingents are incorporated into the army, the recruits shall be divided into three classes. The first class shall be composed of the volunteers; the second of recruits with a certain amount of training; and the third class of the remainder. The recruits of the first class shall serve one year in the active army and five years in the reserve; those of the second class two years in the active army and four years in the reserve; those of the third class, three years in the active army and three years in the reserve. Those belonging to the reserve shall be obliged to take part in the annual maneuvers for a period of time not exceeding sixty days.

The following are exempted from the military service both in peace and in war:

1. Men physically unfit for military service.
2. Holders of diplomas; graduates of the second and highest grade schools of the republic; graduates from the theological courses and seminaries, and the members of religious orders.
3. A man who is the only support of a widowed mother, of an infirm father, or a sister, or who has to educate an orphan brother under 19 years of age.
4. A widower who has the care of a son.

The following are exempted from military service in time of peace.

1. Those who have a brother in the active army or those whose brother died either in battle, or in consequence of wounds received in battle or in the service.

2. Soldiers of the gendarmerie.

3. The sailors of national ships.

4. The proprietors, administrators, or agents of agricultural estates or of factories.

5. The only son or adopted son of the owner of an agricultural estate.

6. Engineers of railroads, of national ships, of factories, of agricultural establishments, and mills where agricultural products are prepared; men employed as postmen or telegraph operators.

7. The proprietor and one employee of a commercial house.

—*Mexico Militar, January 1, 1901.*

CHILE.

PRINCIPAL PROVISIONS OF THE LAW OF SEPTEMBER 8, 1900, ON MILITARY SERVICE.

1. Military service is obligatory for all citizens between 20 and 45 years of age. The term of service is fixed as follows:

Active army: One year (from 20 to 21), of which at least nine months are with the troops.

First reserve: Nine years.

Second reserve: Until the 45th year of age.

2. The following are exempt from the military service:
   - (*a*) Members of the National Congress, the ministers, and the councilors of state.
   - (*b*) Missionaries.
   - (*c*) Justice officials.
   - (*d*) Members of the regular and secular clergy.
   - (*e*) Police officials.
   - (*f*) Directors and teachers of educational establishments.

The following may be exempted:
   - (*a*) Civilian officials.
   - (*b*) Fiscal and municipal treasurers.
   - (*c*) Officials of customhouse, penitentiary establishments, lighthouses, post office, telegraphs, and state railways.
   - (*d*) Physicians in cities, and druggists.
   - (*e*) The only sons, supporting families.

3. The effective strength of the contingent is fixed each year by presidential decree. If the number of men recorded on the lists exceeds the number required, lots are drawn.

4. The President of the Republic may each year call together the contingents of the first reserve for a period of instruction, which is thirty days for those who have served in the active army and ninety for the others. The duration of these exercises can not be prolonged nor can the calling to colors of the second reserve take place without the assent of the council of state.

5. The President of the Republic may organize free courses for aspirant reserve officers, to which young men over 18 years of age who have passed the first five classes of an educational establishment or who possess a suitable education, may be admitted. Those who successfully follow these courses may be promoted according to conditions prescribed by the regulations.

6. The men who have ended their terms of service may, on recommendations of their chiefs, be discharged with grades higher than the ones which they held. A man may successively be promoted to the rank of first sergeant, if he consents to a new period of instruction of three months for each additional grade.

7. The noncommissioned officers, after twelve years of uninterrupted service, will be given positions, with salary not exceeding 1,200 pesos per year, in the police, railways, customhouse, or post office.

8. In time of war the following may also be called to active service:

In the army, young men from 18 to 20 years of age.

In the reserve, men between 45 and 50 years of age.

The enforcement of this law increases the effective strength of the army from 9,000 men, number fixed by the law of November 24, 1895, to 15,000 men.—*Révue Militaire de L'Étranger, March, 1901.*

NETHERLANDS.

THE DUTCH MILITARY LAW OF 1901.

Each year the following numbers of militia shall be called:

For complete exercises, at the most 12,300 men; for short exercises, at the most 5,200 men.

The number of men to be relieved and to be sent to the colors from each province will be fixed each year by cabinet order. The numbers are determined according to statistics drawn up each 1st of September. Those who have seen previous service are not taken into account in the making up of the numbers.

All Dutch subjects above their 18th and below their 21st year, residing in Holland, Germany, or Belgium, are entered on the militia registers. This is fixed by separate instructions.

The rolls for those living in Germany are made up at Amsterdam, and for those living in Belgium, at Rotterdam. Foreigners living in Holland are not entered on these rolls if they do not belong to countries in which the Dutch are liable to military service. This applies also to the colonies.

The following are not liable to military service: Men under 5 feet 1 inch in height, men sick and physically unfit, and those who have to their credit five years' service as privates or noncommissioned officers. Should there be two or more brothers in one family, half of them serve in the army if the number is even, and one-half plus one if the number is odd.

The militiamen called to the colors draw lots with regard to the order in which they are to enlist.

Men condemned to capital punishment, hard labor, or one or more years' imprisonment are not liable to military service.

The service must be personal (no substitute is allowed) and lasts eight years in the land and five years in the naval forces. In time of war no one is allowed to retire.

A militia council presided over by a lieutenant colonel is formed in each province. He is generally a pensioned officer.

The seventh division of the war ministry is that of the militia and schutterij (later landwehr).

The enlisted militiamen are assigned to units of the standing army and the first term of exercises lasts for foot troops eight and one-half months and for mounted troops eighteen months. Those not making good progress with the foot detachments may be kept as long as twelve months. Short terms of exercises last four months each.

Should the number of men drawn by lot not suffice to complete the strength, others may be called to colors, but not in excess of 7,500 men. In 1900 there were 10,500 men called to the colors, while there were 17,900 volunteers on hand.

Enlisted militia may be sent to the colonies only with the approval of the queen.

After the abolition of the schutterij, a landwehr is to be created for the home army. This landwehr is to consist of sections and depots. The term of service is to be seven years; two days out of every six are to be devoted to drills, yet both officers and men, should they desire, are to be allowed to take part in the exercises of the active army. Target practice for the landwehr contingent will be instituted. —*Neue Militärische Blätter*, *November*, *1901.*

GREAT BRITAIN.

REORGANIZATION OF THE BRITISH ARMY.

This is proceeding on the lines laid down by the Hon. St. John Brodrick, secretary of state for war, in his speech in the House of Commons on March 8, 1901, introducing the army estimates. In brief, he said:

That the war in South Africa had shown that a better organization of the army was required, and that in future they must be able to send at least three army corps abroad with proper cavalry divisions, practically 120,000 men, besides having a properly organized force for home defense; that they required more and heavier artillery and more mounted troops, a reformed medical and transport service, better trained officers, less barrack square drill, and more musketry instruction, scouting, and individuality for the men.

Apart from the demands made by the war that they had to maintain 115,000 men in India and the colonies, and were dependent on voluntary recruiting.

That they had decided to develop the existing system rather than (1) to establish a separate Indian army, or (2) adopt compulsory service for home defense. The latter could hardly be taken up after a year which had given them, in various forms, 140,000 voluntary recruits, but with or without compulsory service an efficient defense must be had.

The future system will be:

The division of Great Britain and Ireland into six army corps districts, viz, Aldershot, Salisbury Plain, Ireland, Colchester, York, and Scotland, each district to contain troops of all arms necessary for a corps.

The first three army corps to be composed entirely of regulars.

The last three army corps to include 60 battalions of militia and volunteers, and 21 field batteries of militia and volunteer artillery, in addition to the large proportion of regular infantry and artillery, the volunteer and militia artillery being one-third of the whole of this arm.

Barracks to be erected, and complete supply of stores and means of transport to be provided in each district.

Officers to be appointed to command in peace only if certified to be fit to hold the same commands in war.

Large delegations of authority to commanders of army corps, so as to decentralize administration and centralize responsibility.

The volunteers and militia selected for service in the army corps to be specially trained.

MEN, HOW PROVIDED.

To raise the army corps required the following changes are to be made.

REGULARS.

No great increase contemplated, but to be free from garrison duties abroad—

1. By organizing 8 garrison battalions composed of men of long service.
2. By the employment of 5 Indian battalions in certain stations.
3. By the transfer of certain smaller coaling stations to naval control, which if carried out would release 5 battalions.

MILITIA.

To be increased from 100,000 to 150,000, to have better training, and to be improved by (1) giving all men the 3d. a day ration money given to men in the regular army, (2) by giving each man after two trainings, so as to retain him, a total of £4 10s. (3d. a day) at different periods, instead of the bounty of 30s., and (3) by allowing all men, after army, color, and reserve service, or after ten years' militia service, 4d. a day (£6 a year) for joining the militia reserve for home defense. The men, when necessary, to be trained in musketry. By absorbing the militia reserve of the army into a reserve for the militia the gain would be 50,000 men without raising a single additional recruit.

YEOMANRY.

The yeomanry to be increased to 35,000 men, organized in regiments of 4 squadrons of 500 men; uniformed in khaki, armed with a short rifle and bayonet, allowed extra pay and horse allowance. This body to be called "imperial yeomanry," its object to furnish mounted troops for home defense; colonial yeomanry, if possible, to be affiliated with it for imperial service abroad, if they should volunteer for such service.

VOLUNTEERS.

Twenty-five infantry battalions, 15 field batteries, and 40 batteries of heavy artillery to be specially trained for service in the army corps, in positions around London. This will involve increased drill and rifle shooting.

These measures will give 11,500 additional regulars, 50,000 more militia, an increase of 25,000 yeomanry, and 40,000 more trained volunteers—a total increase of 126,500 men, at an estimated cost of a little less than £3,000,000.

The raising of these corps, and experience in the South African war has shown the necessity for many reforms in the administrative details of the war office. The latter subject was, at the time Mr. Brodrick spoke, under investigation by the "Dawkins" committee, whose report was made in May, 1901. The committee recommended a number of reforms in the direction of simplifying the system of military and financial control and administration; in substituting military officers for the higher civilian clerks, and soldier clerks for the lower clerks in the military departments of the war office, etc.

Total strength of the force which the House of Commons was asked to provide for and its distribution under the proposed scheme:

Strength.

Regulars	155,000
Reserve	90,000
Militia	150,000
Yeomanry	35,000
Volunteers	250,000
Total	680,000

Distribution.

Field army	260,000
Home garrisons	196,000
Volunteers:	
London defenses	100,000
Staffs	4,000
Surplus; sick and recruits	120,000
Total	680,000

During the year many of the changes outlined above have been carried out by orders prescribing changes in equipments, system of clothing allowance and supply, course of musketry instruction, etc., and this will doubtless continue to be done from time to time as the military authorities may decide to be necessary and opportune.

The proposal to substitute naval for army control at certain small coaling stations could not be carried out, as it was very strongly opposed by the admiralty.

The five native Indian battalions have been utilized, as projected, for garrison troops at Mauritius, Straits Settlements, Hongkong, and Weihaiwei.

PERU.

NEW MILITARY LAW.

The military law promulgated in June, 1899, orders obligatory service for every citizen between 19 and 50 years of age.

The army comprises five categories:

I.—The regular army.
II.—Supernumeraries.
III.—First reserve.
IV.—Second reserve.
V.—National guard.

I.—REGULAR ARMY.

The regular army is formed of three groups:

1. Volunteers; these are men between 19 and 30 years of age who enlist for one term only, and men between 23 and 30 years of age who have already served and wish to continue their service.
2. Drafted men (recenseados); young men between 19 and 23 years of age, designated among those inscribed on the community registers.
3. Enlisted men; men called to military service on account of misdeeds committed by them.

II.—SUPERNUMERARIES.

The three above-mentioned groups suffice to maintain the army on the footing determined by the law.

Should unforeseen circumstances necessitate an increase of strength, the supernumeraries are called to colors. These are men who have never served and who are drafted on the community registers. The reserves may also be called to arms in emergencies.

III.—FIRST RESERVE.

The first reserve comprises:

1. Men between 23 and 30 years of age who have completed their terms of service.
2. Young men between 19 and 23 years of age who had married before having served with the colors.
3. The students of technical schools and universities, between 19 and 23 years of age.

IV.—SECOND RESERVE.

The second reserve comprises:

1. Men between 30 and 35 years of age.
2. Teachers and professors of schools, colleges, and universities.

V.—NATIONAL GUARD.

The National guard is composed of:

1. Men between 30 and 35 years of age.
2. Physicians and hospital attendants.
3. Permanent judges.
4. Only sons of poor widows or poor fathers over 60 years of age.
5. Widowers, fathers of minors.
6. The employees of the post and telegraph offices.
7. Chiefs of divisions, municipal judges, and directors of charitable institutions.—*Revista do Exercito e da Armada, February, 1901.*

RUSSIA.

REORGANIZATION OF THE REGULAR DEPOT CAVALRY, RUSSIAN ARMY.

[REPORTED BY CAPT. S. L'H. SLOCUM, EIGHTH CAVALRY, UNITED STATES MILITARY ATTACHÉ AT ST. PETERSBURG.]

The depot cavalry of the Russian army was, until June 4, 1901, composed of:

1. Three depot cadres of the guard, forming together the brigade of depot cavalry of the guard.
2. Seventeen depot cadres of line cavalry, two of each forming a brigade, with the exception of the seventh brigade which had 3 cadres—the thirteenth, fourteenth, and fifteenth, thus giving a total of 8 brigades of depot cavalry.
3. One Caucasian depot cadre.

On June 4, 1901, orders were issued making the following changes:

1. The 3 cadres of the guard to form a regiment of depot guard cavalry of 10 squadrons.

2. The 17 cadres of line cavalry to form depot regiments of line cavalry, 2 cadres per regiment, each of 6 squadrons, with exception of cadres 13, 14, and 15, which together form a depot regiment of 9 squadrons.

The regiments of depot cavalry to take the numbers of the brigades of depot cavalry which previously existed.

3. The Caucasian depot cavalry to be formed into a "group" of depot cavalry of 3 squadrons. The depot regiment of the guard to be attached to the second division of guard cavalry and placed under the orders of the commanding general of this division.

The first brigade, quartered in the military district of Moscow, to comprise the third, fourth, and sixth depot regiments; the second brigade, quartered in same district, the first, second, and seventh regiments; and the third brigade, headquarters at Kharkof, to comprise the fifth and eighth regiments and the Caucasian "group" of 3 squadrons.

These new brigades are to be commanded by generals of division (or of brigade) each assisted by a field officer.

The complement of a regiment of a depot cavalry to be as follows:

	Guard depot regiment of 10 squadrons.	Line depot regiment of 9 squadrons.	Line depot regiment of 6 squadrons.	Caucasian group of 3 squadrons.
General officers	1			
Colonels	3	1	1	1
Lieutenant colonels		3	3	1
Subaltern officers	33	30	21	12
Civil officers	6	6	6	3
Combatant noncommissioned officers and men	762	770	530	284
Noncombatant noncommissioned officers and men	99	92	64	37
Horses pertaining to the depot regiments	196	198	132	66
Horses pertaining to the active regiments	754	810	540	270

The commanders of depot brigades are to have the same powers as a general of division of the active army, and to command in time of peace and in time of war.

The officers of depot cavalry are to be furnished by transfers from among the lieutenants and second captains of the active army. The promotion of subaltern officers up to the rank of second captain inclusive, will be made regimentally, according to the regulations applying to the rest of the cavalry. The promotion to a higher rank will be made by the captains of the guard and the line, in accordance with the regulations now in force.

The troopers are taken by selection from the annual contingent of recruits, preferably those who have served in the "studs" or in the breeding establishments of the steppes, and in general those who are accustomed to the care of horses.

Each guard and line regiment of the active army is to correspond numerically with one of the newly formed depot squadrons.

In time of peace the duty of the depot cavalry will be to assure the preliminary training of the young horses intended for the active regiments. These horses are delivered to the depot regiments by the remount commissions at stated periods, fixed by the inspector general of remounts. Each year on June 1 (Russian style) the commanders of these depot regiments assign the young horses equally to their squadrons, classing them in categories. They pick out the horses unfit for service and upon the approval of the inspector general of cavalry sell them for the benefit of the imperial treasury. On July 1 (Russian style) the brigade commanders will inform the generals commanding active divisions, of the number of horses fit and ready to be sent to the different regiments. They are sent to the regiments by special detachments under an officer and on their arrival must be accepted.

In time of war the rôle of the depot cavalry will be to form squadrons and detachments of reenforcement to repair the losses in the active regiments. Each depot squadron forms two squadrons of reenforcement, the effective of each being 1 captain, 4 subaltern officers, 191 men, and 213 horses; it can also eventually form a third squadron of reenforcement of 180 troopers (135 combatants, 45 noncombatants) who are drawn from the reserve, as the general staff may direct.

For the purpose of commanding the first squadron of reenforcement, each active regiment in war time will detach to its depot squadron a second captain; it will detach at the same time a certain number of troopers and those who have joined on condition that they do not serve in campaign. On the other hand it will be short in peace time by two second captains detached to the depot squadron.

The second squadrons of detachments of reenforcement are commanded by officers of the reserve.

In January, 1902, the Finnish dragoon regiment was disbanded and subsequently reorganized and designated the fifty-fifth regiment of dragoons. As a Finnish regiment it had its own separate depot cadre. Under its reorganization into a Russian dragoon regiment, it will have probably like the others a depot squadron, thus giving a grand total of 65 depot squadrons of guard and dragoon (line) cavalry, corresponding to the 65 active regiments.

VARIOUS MODIFICATIONS IN THE ORGANIZATION OF COSSACK TROOPS.

A new cavalry division of 2 brigades has been formed and will be incorporated in the first Turkestan army corps. It is composed as follows:

FIRST BRIGADE.—Second regiment of Ural Cossacks; fourth regiment of Orenburg Cossacks.

SECOND BRIGADE.—Fifth and Sixth regiments of the Orenburg Cossacks; First regiment of the Siemirechensk Cossacks.

The horse brigade of the transcaspian Cossacks belongs to the second army corps, and there is an independent brigade of West Siberian Cossacks consisting of 2 regiments (the third being stationed in Siberia).—*Revue de Cavalerie May, 1901.*

SERVIA.

MODIFICATIONS IN THE ORGANIZATION OF THE ARMY.

The law of December 20, 1895, organizing the Servian army, modified on July 19–31, 1898, has again been modified by the law of January 12–24 and two decrees of August 5–18, 1900.

The principal modifications contained in the law of January 12–24 are the following:

The obligation of medical examination of officers to be retired has been abolished; they may be retired "on account of infirmities or if, in general, the officer is found incapable of fulfilling his duties."

The men belonging to the first ban of the national army are under the obligation to keep the saddle horses and draft horses necessary for the organizations to which they belong. The new law imposes, in case of failure, a fine ($58.50) which may be doubled and renewed every three months.

The reserve men who do not respond to the call to colors for exercises are obligated to serve a double term, while formerly they had to double only the days they were absent. The punished reserve men must provide their own rations.

The table of pensions for sergeants has been modified. Retirement pension after fourteen years of service has been slightly diminished, but the pension is larger for sixteen years' service and is then increased every two years.

The two decrees of August 5–18, 1900, completely modify the organization of the higher commands by separating the great general staff from the command of the active army.

The command of the active army is intrusted to the general officer who holds the highest military rank after the minister of war, while yet being absolutely subordinate to the latter. His rights from a disciplinary point of view are quite equal to those of the minister. He pronounces on all the transfers of officers which are not determined by decrees, as well as the transfer of the noncommissioned officers; he also keeps the records of the officers. His duty consists in insuring the uniformity of instruction of the army. For this purpose he prepares and directs the maneuvers. He is the inspector general of the troops of all branches and of all military establishments. The preparation of measures to be taken in case of war does not belong to his jurisdiction. It belongs to that of the chief of the great general staff under authority of the minister of war.

The staff of the commander of the active army is reduced to a few officers only. Referees, field officers, or even generals, are detailed to assist him for each branch; those of the infantry and artillery form part of the general staff; those of the cavalry and engineers are the commanders of these arms.

In being made a separate department, the general staff has been placed under the orders of the minister of war, but does not form part of the ministry proper.

The chief of the great general staff has a position almost analogous to that of the commander of the active army. A colonel is detailed as assistant to him, with the assimilated rank of commander of division. The great general staff works out the preparation for war. It consists of three divisions: (1) The division of operations, intrusted with the organization, armament, instruction, defense of the territory, mobilization, transportation of troops, study of foreign armies, and statistics of foreign countries; (2) the historical division, intrusted with the archives of the library; (3) the geographical division, comprising three sections: surveying and geodesy, topography, and cartography. The chiefs of divisions have each the rank of colonel, with a position equaling that of brigade commander.

The bureau of aids-de-camp (personnel) which formerly formed part of the active army and had the custody of promotions, strength, personnel, requisition matters, etc., is directly subordinate to the war ministry.

A general-staff committee is instituted under the presidency of the chief of the general staff, and deals especially with matters pertaining to the personnel of the general staff—examinations, admissions to the corps, return to the troop units, etc. The relations between the commander of the active army and the chief of the general staff are not defined. The general staff corps, placed under the orders of the commander of the active army, was reorganized at the same time as the higher command. It consists of 72 officers, with grades of colonels down to captains, inclusive, as follows:

10 colonels,
12 lieutenant colonels,
15 majors,
20 first captains,
15 second captains.

The conditions for admission are the following:

(*a*) To have commanded with the mark "very good," an appropriate unit of troops for three years in the case of lieutenants, for one year in the case of captains, and for two years in the case of majors.

(*b*) To have successfully followed the courses of the military academy.

(*c*) To have completed a course (stage) in the general staff for two years in the case of the subaltern officers and for one year in the case of the field officers, during which courses biweekly studies are made and general-staff journeys performed.

(*d*) To know perfectly one foreign language (French, German, or Russian).

(*e*) To ride well and know how to swim.

(*f*) To have been accepted by the committee of the general staff.

The lieutenants fulfilling these conditions enter the general staff with the grade of second captain. The officers of all grades admitted to this service are definitely classified in the corps of the general staff only after having held an appropriate command for the regulation term. Officers who have graduated at a foreign military school are subjected to the same conditions and to the same tests as those who have studied in Servia.

The promotion of the officers of the general staff takes place in the minimum time fixed by the law, provided there are vacancies and the cadres of the general staff do not exceed the limits indicated above. The officers may be promoted even should there be no vacancies in the cadres, on the condition of entering another arm or corps. Captains before promotion to the rank of field officers must pass special examinations before the committee of the general staff. Majors transferred directly from the line must also pass a special examination before the committee of the general staff.

It is seen that the recruiting of the officers of the general staff in Servia is surrounded by all the necessary safeguards. It must be likewise remarked that, in comparison with officers of the troops, the officers of the general staff enjoy great advantages in promotions.—*Revue Militaire de l'Étranger, October, 1901.*

NEW ARMY ORGANIZATION.

The following data on the new Servian army organization is taken from the Voyenen Zhurnal No. VI:

Liability to military service begins at the age of 20 and lasts until the age of 50. The men liable to military service between the ages of 20 and 45 compose (in three bans) the national army and those between the ages of 45 and 50 the army of the landsturm; to this category belong likewise young men over 17 and under 20 years of age, also men who have passed 50 years, as these may also be called to arms according to article 2 of the law.

The first ban of the national army consists of permanent nuclei and their reserves, and is composed of men between the ages of 20 and 31.

The second ban consists of all those whose time of service is limited, be it on account of family or other circumstances, and of men of the active army who formerly belonged to the first ban; the service lasts until the 37th year.

The third ban is composed of all the reserves who have completed their term of service in the second ban, i. e., men between the ages of 37 and 45.

The first ban forms the field army, the second serves for the reenforcement of the first, and the third for the defense of the frontiers. The landsturm is used only when the greatest danger is threatening the country.

Active service lasts two years for the cavalry and artillery (article 8 of the law) and one and one-half years for other branches and institutions; this is the full term of service. Diminished term of service is six months for university students, and those of other educational establishments, such as the higher commercial schools, seminaries, etc., if it is necessary for them to continue their studies, and if they desire to pass the examination of reserve officers at the close of the six months' service. Any man not obtaining his graduation certificate is under obligation to serve fourteen months. All those liable to serve the full two years' term may likewise have this term reduced to fourteen months each if they have distinguished themselves by great progress and good marksmanship.

In order to counterbalance the evil arising from so short a service with the colors the new regulations give the minister of war the most extensive powers with regard to the call to colors of the reserves of all the bans for exercises and also with regard to the military training of the young men.

While the old law limited the period of exercises of the reserves of the active army (the first ban of the present day) to thirty days, the reserves of the second ban to thirty days at the highest and those of the third to only fifteen days, the new military law orders (article 84) that all reserves of the first, second, and third bans and the men belonging to the landsturm should exercise not only on Sundays and holidays, but also during the periods when no agricultural work can be done.

In addition to this the men are under obligation to serve during longer exercising periods, as:

The first ban reserves, a ten-day battalion and twenty-day regimental drill. The maintenance of these men is supplied by the state during these drills as well as during the maneuvers and the cost is provided for in the military budget.

The reserves of the second and third bans may also be called to a ten-day drill during battalion exercises and a five-day drill during regimental exercises, but they must provide their own maintenance. These reserves may be called to the colors also to join the autumn maneuvers and then their maintenance is supplied by the state.

The men belonging to the landsturm may, in addition to drills on Sundays and holidays, be called to a five-day drill, but must maintain themselves at their own expense.

As has already been mentioned, the minister of war has full power of decision with regard to the military training of the school contingent. He decides, after conferring with the minister of public instruction, on the study of military subjects, its scope and duration.

In the lower schools the teaching is placed in the hands of the teachers; in "gymnasia" (secondary schools) and similar establishments, in the hands of reserve officers; and in the universities, in case of lack of reserve officers, in the hands of active officers.

The minister of war is intrusted likewise with the supervision of all gymnastic and rifle societies of the country.—*Internationale Revue, December, 1901.*

REORGANIZATION OF THE SERVIAN ARMY.

The 15 infantry regiments of 4 battalions each have been transformed into 30 regiments of 2 battalions each, and the 15 regimental districts have been changed into 15 brigade districts. A number of regiments have received the names of high officials and celebrated generals.

The life guards' regiment in the cavalry has been abolished, and instead of it there has been formed a squadron of royal bodyguard of 150 men; the 4 cavalry regiments have been increased by a fifth under the denomination of Royal Draga and the expenditure incurred for the necessary 480 horses has been covered by a national loan.

Only captains of the first and second class who are efficient in riding and have commanded a section for three years, may be appointed to command companies, squadrons, or batteries; they must also possess the necessary moral qualities and have a practical and theoretical training in fortification and knowledge of terrain, be capable of making topographical surveys, and thoroughly posted concerning the armament of the artillery and infantry of their own country and of the neighboring armies.

Only majors and lieutenant colonels who receive certificates of efficiency from their chiefs may be promoted to command battalions.

Only colonels or lieutenant colonels shall be appointed to command regiments in the future and only colonels shall command brigades. The post of district officer has been newly created. It is similar to the district commanders in Russia. Captains of the first class are appointed to these posts. They rank as chiefs of battalion.—*Internationale Revue, October, 1901.*

SWEDEN.

REORGANIZATION OF THE SWEDISH ARMY.

[Reported by Lieut. Col. W. R. Livermore, Corps of Engineers, United States Military Attaché at Copenhagen and Stockholm.]

According to the new organization law of May, 1901, the army is to consist of six complete similarly organized divisions and one cavalry division, besides the garrisons which are to be maintained in the fortifications in time of peace.

Each of the six similar divisions is to contain, for the field army, 4 infantry regiments, 1 cavalry regiment, 1 field artillery regiment, and 1 train corps. The field engineers are to be organized in such a way that at the outbreak of a war, each army division can be supplied with 1 field engineer company, 1 bridge column, and 1 field telegraph detachment. The cavalry division is to be formed by mobilizing the 2 large (10-squadron) regiments in Skåne and the mounted division of the Wendes artillery regiment.

The garrisons are:

In Karlskrona: One infantry regiment (2 battalions) and 1 engineer company, besides the seacoast artillery organized in the navy.

In Vaksholm and Oscar-Frederiksborg: One infantry regiment (2 battalions) and 1 engineer company, together with the seacoast artillery organized in the navy.

In Boden: One infantry regiment (3 battalions), 6 companies of fortress artillery regiment, and 4 engineer companies.

In Karlsborg: Four companies of the fortress artillery regiment.

In time of war the fortifications are to have reserve and depot troops.

A description of the organization of the Swedish army until a short time prior to the reorganization will be found in Lieutenant Allen's report on the Military System of Sweden, published in No. XII of the Notes of the Military Information Division.

CHANGES UNDER THE NEW LAW.

Tenement soldiers (soldiers supported by certain districts or estates, for which service said districts and estates are exempt from certain taxes and from conscription) are to be gradually discontinued and will wholly cease in 1909, when all regiments will be filled by conscription and volunteers.

To each organization there is to be attached a certain number of officer volunteers, reserve officer volunteers, and volunteers, from whom the officers, the reserve officers, and the noncommissioned officers are to be recruited.

The length of the service of conscripts is fixed at one hundred and seventy-two days until after 1908, when it is to be two hundred and forty days, except with the cavalry, the field engineer, the field telegraph, and the field artillery troops, for whom it is then to be three hundred and sixty-five days.

The pay of conscripts is fixed at 20 öre (5 cents) per day, except men serving three hundred and sixty-five days, who get 50 öre (12.5 cents) per day for service in excess of two hundred and forty days.

GENERAL STAFF.—Personnel is to be increased by 1 colonel, 2 majors, 4 captains of first class, 2 lieutenants of first class.

INFANTRY.—Two new regiments are to be formed from the 4 independent battalions and corps. The Gotland regiment is to be strengthened by conscripts (350?) sent from the mainland. For convenience of reference, the 28 regiments of infantry are numbered as follows: Class (*a*), ordinary regiments—1, foot bodyguard; 2, first bodyguard grenadier; 3, second bodyguard grenadier; 4, Vestgöta; 5, Upland; 6, Skaraborg; 7, Södermanland; 8, Kronoberg; 9, Jönköping; 10, Dal; 11, Helsinge; 12, Elsborg; 13, Bohusläu; 14, Vestmanland; 15, Norbotten; 16, Vesterbotten; 17, Kalmar; 18, Vermland; 19, Jämtland feldjäger; 20, North Skåne; 21, South Skåne; 22, Vesternorrland; 23, Vestgötadal regiment (reorganized and assigned to first army division). Class (*b*)—24, Svea bodyguard; 25, Göta bodyguard. Class (*c*), new regiments—26, from Småland grenadier corps and Blekinge battalions; 27, from Halland battalion and Vermland feldjäger corps. Class (*d*)—28, Gotland regiment.

Personnel of the infantry.	Regiments as above numbered.			
	(*a*) 1 to 23.	(*b*) 24 and 25.	(*c*) 26 and 27.	(*d*) 28.
THE STAFF.				
Colonel and chief	1	1	1	1
Lieutenant colonel	1	1	1	1
Majors	2	2	1	2
Captain of second class (regimental quartermaster)	1	1	1	1
Lieutenant of first class (first regimental adjutant)	1	1	1	1
Lieutenant of second class (second regimental adjutant)	1	1	1	1
Second lieutenant (third regimental adjutant)	1	1		
Regimental chaplain	1	1	1	1
Auditor	1	1	1	1
Regimental surgeon	1	1	1	1
Battalion surgeon	2	2	1	2
Sergeants of first class (battalion sergeant major)	3	3	2	2
Sergeant major (pay sergeant)	1	1	1	1
Sergeant of first class (hospital sergeant)	1	1	1	1
Hospital corporals	4	4	2	3
Hospital lance corporals (vice corporals)	4	4	3	3
Hospital privates	4	4	3	3
Gunmaker	1	1	1	1
Gunmaker corporal	1	1	1	1
Gunmaker lance corporals (vice corporals)	1	1	1	1
Gunmaker private	1	1	1	1
Chief musician, first sergeant	1	1	1	1
THE COMPANIES.				
Captains of first class	8	8	6	8
Captains of second class	4	4	4	4
Lieutenants of first class	9	9	6	11
Lieutenants of second class	9	9	6	10
Second lieutenants	9	9	6	10
First sergeants	12	12	8	8
Sergeants of first class	9	9	6	11
Sergeants of second class	12	12	8	16
Lance sergeants (distinction corporals)	36	36	24	32
Corporals	48	48	36	40
Lance corporals (vice corporals)	48	60	36	48
Officer and reserve officer volunteers	12	12	8	10
Other volunteers	48	360	32	240
Band sergeants of first class	6	6	4	6
Band sergeants of second class	6	6	4	6
Drummers and trumpeters	24	24	16	16
Men (including "other volunteers")	*	668	475	350

* 852, except in regiments Nos. 15, 16, and 19, which have 568.

The number of men in regiments Nos. 15, 16, 19, and 26 are to be reduced to 300, 375, 480, and 390 respectively; in regiments Nos. 1 to 14 inclusive and 20 to 23 inclusive, to 520. These reductions are to be effected before 1909, after which time the ordinary regiments (1 to 23) may at the will of the King be increased by 72 volunteers each and the two new regiments (26 and 27) may be increased by 48 volunteers each.

CAVALRY.—No change is made in the number of regiments or squadrons. The number of officers, noncommissioned officers. and attached volunteers is increased. The regiments may be numbered as follows: 1, horse bodyguard; 2, dragoon bodyguard; 3, hussar bodyguard; 4, Småland hussar; 5, crown-prince hussar; 6, Norrland dragoon; 7, Skåne hussar; 8, Skåne dragoon.

Personnel of the cavalry.	Regiments.	
	1 to 6.	7 and 8.
THE STAFF.		
Colonel and chief	1	1
Lieutenant colonel or major	1	1
Majors		2
Captain of second class (regimental quartermaster)	1	1
Lieutenant of first class (regimental adjutant)	1	1
Regimental chaplain	1	1
Auditor	1	
Regimental surgeon	1	1
Battalion surgeons	1	1
Regimental veterinary surgeon	1	1
Battalion veterinary surgeons	1	2
First sergeant (pay sergeant)	1	1
Hospital corporals	2	4
Hospital lance corporals (vice corporals)	2	4
Hospital privates	2	4
Horseshoers, corporals	3	7
Horseshoers, lance corporals (vice corporals)	4	7
Horseshoers, privates	4	8
Gunmaker	1	2
Chief musician (band first sergeant)	1	1
THE TROOPS.		
Captains of first class	5	10
Captain of second class	1	1
Lieutenants of first class	6	13
Lieutenants of second class	6	11
Second lieutenants	5	10
First sergeants	5	10
Sergeants of first class	5	10
Sergeants of second class	5	10
Lance sergeants (distinction corporals)	20	40
Corporals	30	60
Lance corporals (vice corporals)	30	60
Officer and reserve officer volunteers	6	12
Other volunteers	195	300
Band sergeants of first class	3	6
Band sergeants of second class	2	4
Trumpeters	10	20
Men	*425	840
Horses	600	1,200

*To be reduced to 350 by 1909 in regiments No. 2, 3, and 4.

ARTILLERY.—The field artillery is to be supplied with howitzers, 1 division (2 batteries) to each regiment; the field batteries are to be composed of 4 instead of 6 pieces. A field-artillery regiment will thus be composed of 3 divisions each containing 3 batteries of 4 guns each and 1 division containing 2 batteries of 4 howitzers each; the Wendes artillery regiment will also have 1 mounted division containing 3 batteries of 4 guns each.

A position artillery regiment with 6 batteries divided into 2 divisions is to be constituted. This regiment is to be intermediate between field troops and fortification troops. Its duty is to strengthen the field army and occasionally even the reserve (garrison) troops assembled at certain places, and to form the artillery garrison in temporary fortifications and in the fight about the fortified field positions.

A land-fortification artillery regiment with 10 companies, which include the Karlsborg artillery corps, is to be constituted, with 6 companies at Boden and 4 at Karlsborg.

The field batteries of the Gotland artillery corps are to be changed to batteries of 4 guns and its fortification company is to be changed to a position battery.

To strengthen the mobile defensive forces in Norrbotten, 1 field-gun division and the new field-howitzer division of the Norrland artillery regiment is to be placed at Boden.

The artillery corps of Vaxholm and Karlskrona are to be discontinued and a coast-artillery corps (under the navy) is to be organized.

The organizations may be numbered as follows: Field artillery regiments, 1 to 6 (1, first Svea; 2, first Göta; 3, Norrland; 4, second Svea; 5, second Göta; 6, Wendes); 7, Gotland artillery corps; 8, Position artillery regiment; 9, Fortress artillery regiment.

Personnel of the artillery.	Organizations as numbered above.				
	1 to 5.	6.	7.	8.	9.
THE STAFF.					
Colonel and chief	1	1	------	1	1
Lieutenant colonel	1	1	1	1	1
Majors	3	4	------	2	2
Captain of second class (regimental quartermaster)	1	1	------	1	1
Lieutenant of first class (regimental adjutant)	1	1	------	1	1
Lieutenant of second class (second adjutant)	------	------	1	------	------
Regimental chaplain	1	1	------	1	2
Auditor	1	1	------	1	2
Regimental surgeon	1	1	------	1	1
Battalion surgeon	1	1	1	1	1
Regimental veterinary surgeon	1	1	------	------	------
Battalion veterinary surgeon	1	1	1	1	------
Hospital corporals (second constables)	3	4	2	2	3
Hospital lance corporals (vice constables)	4	5	2	2	3
Hospital privates	4	5	3	2	4
Artificers, corporals (second constables)	3	4	1	2	------
Artificers, lance corporals (vice constables)	4	5	1	2	------
Artificers, privates	4	5	2	2	------
Horseshoeing corporals (second constables)	3	4	1	2	------
Horseshoeing lance corporals (vice constables)	4	5	1	2	------
Horseshoeing privates	4	5	1	2	------
Chief musician, first sergeant	1	1	1	1	2
THE BATTERIES.					
Captains of first class	11	14	4	6	10
Captains of second class	8	9	2	5	9
Lieutenants of first class	10	13	5	6	10
Lieutenants of second class	9	10	4	5	9
Second lieutenants	10	12	4	6	10
First sergeants	15	18	4	12	20
Sergeants of first class	15	19	5	12	20
Sergeants of second class	15	19	4	12	20
Lance sergeants (first constables)	55	70	22	30	50
Corporals (second constables)	55	70	22	30	50
Lance corporals (vice constables)	55	70	22	30	50
Officer and reserve officer volunteers	18	20	4	14	16
Other volunteers	138	168	67	72	130
Band sergeants of first class	6	7	------	3	3
Band sergeants of second class	5	6	------	3	2
Trumpeters	9	10	5	6	10
Men	360	510	75	*500	*500
Horses	440	584	85	60	------

* Estimated from former strength of fortress batteries. (See text.)

The coast artillery consists of 1 general (chief), 2 colonels, 2 lieutenant colonels, 6 majors, 38 captains, 51 lieutenants, 154 sergeants, 1,314 men, 3 surgeons, 2 chaplains, 1 storekeeper, and 1 auditor.

The ordnance department of artillery will have the following permanent personnel: One ordnance engineer, 13 storekeepers, 10 noncommissioned officers, 7 armor inspectors, 14 ordnance writers, and 84 artificers.

ENGINEERS.—One new field telegraph company and 6 new fortification companies are to be organized.

There will be the following personnel at the fortifications: Two colonels, 3 lieutenant colonels, 8 majors, 26 captains of first class, 14 captains of second class, 33 lieutenants of first class, 17 lieutenants of second class, 126 second lieutenants, 42 first sergeants, 33 sergeants of first class, 33 sergeants of second class, 1 regimental chaplain, 1 secretary, 2 auditors, 2 regimental surgeons, 3 battalion surgeons, 2 battalion veterinary surgeons, 1 cashier, 10 storekeepers, 9 foremen, 15 ordnance artificers, 3 gunmakers, 3 band first sergeants, 12 band sergeants, 4 watchmen.

The engineer-troop formations will have the following permanent personnel: Svea and Göta battalions each will have 16 lance sergeants (of whom 3 are miners or artificers), 33 corporals (of which there are 6 miner or artificer corporals, 1 hospital corporal, 1 gunmaker corporal, and one horseshoeing corporal), 38 vice corporals (of which there are 9 miner or artificer vice corporals, 1 hospital vice corporal, and 1 horseshoeing vice corporal), 3 hospital soldiers, 2 gunmaker soldiers, 2 horseshoeing soldiers, 15 officer and reserve officer volunteers, 104 other volunteers, 8 trumpeters.

The two field telegraph companies together will have 12 distinction corporals (of whom there is 1 artificer distinction corporal), 29 corporals (of whom there are 5 artificers, 2 hospital, and 1 horseshoeing corporals), 29 vice corporals (of whom there are 6 artificers, 2 hospital, and 1 horseshoeing vice corporals), 2 hospital soldiers, 1 gunmaker soldier, 1 horseshoeing soldier, 76 volunteers, 4 trumpeters.

In the six fortification engineer companies together there will be 18 distinction corporals (of whom 6 are miners or artificers), 39 corporals, (of whom 12 are miners or artificers, and 3 hospital corporals), 36 vice corporals (of whom 12 are miners or artificers), 3 hospital soldiers, 3 gunmaker soldiers, 120 volunteers, 12 trumpeters.

In each of the Svea and Göta engineer battalions there will be 54, in each field telegraph company 25, and in each fortification engineer company 10 horses.

TRAIN CORPS.—Two new train corps are to be organized. Each of the six corps will have the following personnel:

The staff will have 1 lieutenant colonel or major as chief, 1 captain of second class, 1 regimental chaplain, 1 auditor, 1 regimental surgeon, 2 battalion surgeons, 1 battalion veterinary surgeon, 1 horseshoeing corporal, 1 horseshoeing vice corporal, 1 horseshoeing soldier, 1 gunmaker soldier, 4 artificers, 1 band sergeant of first class, 1 band sergeant of second class.

The company will have 3 captains of first class, 1 captain of second class, 3 lieutenants of first class, 3 lieutenants of second class, 3 second lieutenants, 6 first sergeants, 6 sergeants of first class, 6 sergeants of second class, 9 distinction corporals, 18 corporals, 18 vice corporals, 2 officer and reserve officer volunteers, 24 other volunteers, 6 trumpeters, and 54 horses.

MEDICAL AND VETERINARY CORPS.—The number of field surgeons is to be increased from 47 to 60; of these 20 are to be of the first class and 40 of the second class. The number of the veterinary surgeons is to be increased from 5 to 8.

INTENDANT CORPS.—The following positions are to be constituted: One over-field intendant, 1 field intendant, 1 field intendant of first class, 1 field intendant of second class, 8 intendants of first class, 24 underintendants, and 22 storekeepers. The present positions of extra intendant and of 19 watchmen will be discontinued.

SCHOOLS AND REMOUNTS.—The chief of the riding school, the chief of the infantry shooting school, and the chief of the board of remounts are each to have the salary of major.

III.—FIELD ARTILLERY.

[Compiled by First Lieut. H. B. Ferguson, Corps of Engineers.]

The Field Gun.—There are two general types of modern field guns, namely, (1) guns on rigid carriages and (2) guns with recoil on the carriages. Neither of these types has yet obtained the unanimous preference.

With a gun of the first type the whole carriage moves to the rear in recoil. It is returned to the firing position by rolling down the wedge-shaped wheel shoes in the Nordenfelt system or by springs in the various spring-trail-spade carriages. Strictly speaking, guns of this type are classed as "guns with accelerated fire." The greatest possible rapidity of fire is not obtained; simplicity, strength, and lightness of material are advantages of this type. The failure of the carriage to return to the exact first firing position and the uncertain action of the spade in hard ground are disadvantages.

With a gun of the second type the carriage remains stationary during firing and the gun slides on the cradle, the recoil being taken up by a hydraulic buffer whose cylinder and piston are connected to the gun and cradle, respectively (or vice versa). A spring or air recuperator returns the gun to the firing position. Great rapidity of fire is obtained; complexity of mechanism, increased weight, and liability to fatal injury in action are the disadvantages.

Guns of the first type approach those of the second as the amount of recoil on the ground is diminished by allowing the gun a certain amount of sliding motion on the carriage and by using buffers or springs to take up part of the recoil. The Boer gun is an example.

As yet France and Germany are the only countries whose artilleries are actually armed with rapid-fire field guns. The various rapid-fire guns adopted by other countries are being constructed; meantime, the actual armaments are the old models. France uses a gun with recoil on the carriage. Germany uses a gun with rigid carriage. Russia, Italy, Belgium, and Sweden (for her horse artillery) have adopted guns with rigid carriages. Norway has adopted a gun with recoil on the carriage. Spain has purchased abroad an assortment of both types. In the new Japanese gun the recoil seems to be taken up on the carriage. Other countries have not yet made final decisions.

FIELD HOWITZERS AND FIELD MORTARS.—The importance of having powerful guns for high-angle fire and that such guns shall be part of the field artillery is generally recognized. France has a 12-centimeter field howitzer, but as it is too heavy (2,400 kilograms) for field use, a lighter model of the same caliber will probably be adopted in the near future. Germany has both a light and a heavy field howitzer which would seem to answer all theoretical requirements. Russia has a 15.26-centimeter field mortar. Great Britain uses the 5-inch siege howitzer as a field howitzer. Austria-Hungary and Italy have only their 15-centimeter siege howitzers, which are too heavy for field work. Mexico has an 8-centimeter mountain mortar. According to the new law (1901) part of Sweden's field artillery is to be armed with howitzers.

AUSTRIA-HUNGARY.

The old armament of 9-centimeter field guns is retained. Experiments continue to be made.

"On September 4, 1901, at the Felixdorf firing grounds at Steinfeld were tested (1) the bronze-steel field gun, Thiele system, on carriage of the Kropatschek system with spring trail spade and rope brake, constructed by the Austrian military committee; (2) an Ehrhardt field gun; (3) a Skoda nickel-steel field gun.

"Although the apparently official report stated that 'the results of the experiments had not been sufficiently definite to lead to a decision on the gun to be adopted,' still the inference can not be drawn from this statement that the object of these Felixdorf trials was to reach a decision concerning the adoption of one of the systems tested. It seems rather that the decision had been reached beforehand that the Ehrhardt and Skoda guns should be left out of consideration, and that a suitable type of carriage with limited recoil, instead of the Kropatschek carriage, should be sought for in the Thiele gun in future experiments. The *Reichswehr* remarks in this connection, that 'the report of certain journals that the piece consisted of a gun of Thiele bronze on an Ehrhardt carriage is not correct.'

"On September 6 and 7 attacking maneuvers with war ammunition were held at Veszprim, Hungary. Herein took part (*a*) a battery of the field guns mentioned above under (1), constructed by the military committee and having spring-trail-spade carriages, the purpose being to show the Emperor how these guns worked in the field; (*b*) a battery consisting of 10.5 and 15 centimeter howitzers and 21-centimeter mortars, here tested in field use on a large scale for the first time in Austria-Hungary. No Ehrhardt gun took part in these exercises.

"The definite solution of the rapid-fire field-gun problem is again postponed in Austria-Hungary, although a noteworthy advance has been made toward the decision in favor of a carriage with limited recoil. A speedy settlement of this question is desired on the part of the military authorities. 'The scheme for the reorganization of all the field artillery is already prepared, so that in case a decision (in the above-mentioned matter) is reached by spring [1902] the issue of the new regulations, which means the entire reorganization of the artillery, may be expected. Everything is ready except that the carriage question awaits a solution.' "—*Internationale Revue, November, 1901.*

While all other countries have settled the question of metal for high-power guns in favor of steel against bronze, the new Austrian field gun is made of bronze, having, according to some reports, a lining of steel which can be renewed. The caliber is 7.65 centimeters. The breech closure is similar to the Nordenfelt. It is reported that 3 batteries (18 guns, carriages being subject to change) have been formed.

HOWITZERS.—Such excellent results were achieved with the 10.5-centimeter and 15-centimeter howitzers and 21-centimeter mortars at Veszprim that their adoption as a component part of the siege-battery troops which take part in field warfare is practically certain. The 10.5-centimeter howitzer is designated C/99. The tube is bronze and has the Leitwell (translating roller) breech closure. The spring-trail-spade carriage, which permits more elevation than does the French 12-centimeter howitzer carriage, has given favorable results. An experimental battery of 6 howitzers with 6 ammunition wagons has been assigned to the field artillery. A long practice march and extensive firing tests are part of this year's program.

FRANCE.

Field regulations for the 7.5-centimeter rapid-fire field gun have appeared. They are dated November 16, 1901, and replace the provisional regulations of July 18, 1898. While the regulations of 1898 contain no technical information relative to the 7.5-centimeter material, the new regulations contain a number of figures and details of construction.

The line of sight may be elevated to 1.5 meters above the ground by means of the "extension piece of the aiming gear." The extension piece serves for giving the direction during the first aiming, after which it is removed and the position of the gun as aimed is marked. Two extension pieces, one fitting into the other, may be used for raising the line of sight to 1.8 meters above the ground.

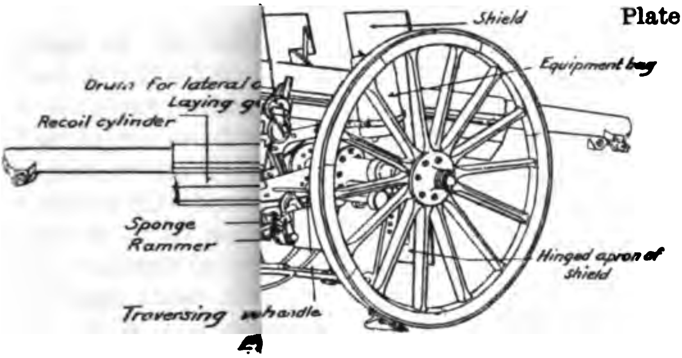
There is a battery telescope with graduated arcs. Great stress is laid on indirect firing. The direction and elevation are usually first obtained by the telescope, placed where it can be seen from one or more of the guns; each gun is then pointed by means of its graduated level and deflection arc.

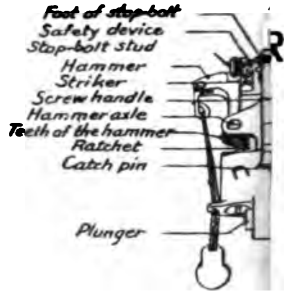
The fuze-setter appears to be the same as the one used with the old gun. The shell is placed with its fuze in the cup, a handle is turned till the range named is opposite the index, when a lever is depressed and the fuze cut.

To put the shoe brakes on the wheels, the trail is lifted up and the shoes let down; when the trail is lowered again the wheels ride up on the shoes; the carriage comes back about 15 inches in the process, and the first shot sends it back about 4 inches farther in driving in the spade. (A new device invented by Captain Ravon has for its object the simplification of the operation of maneuvering the shoe brakes. The total time of going into battery is now two minutes; with the new device it is said to be about forty seconds.) The details of the recoil buffer are still carefully concealed. In the artillery harness, breast straps are used instead of collars.

The piece is usually served by six cannoneers, whose principal duties are as follows: Nos. 1 and 2 supply the fuze-setter with cartridges. No. 3 sets and cuts the fuzes and hands the cartridges to No. 4. No. 4 introduces the cartridge into the chamber. No. 5 gives the elevation, opens and closes the breech, and discharges the piece. No. 6 makes the lateral allowance, aims, and marks the position of the gun. Nos. 1, 2, and 3 work behind the shelter formed by tilting the rear

Plate I.

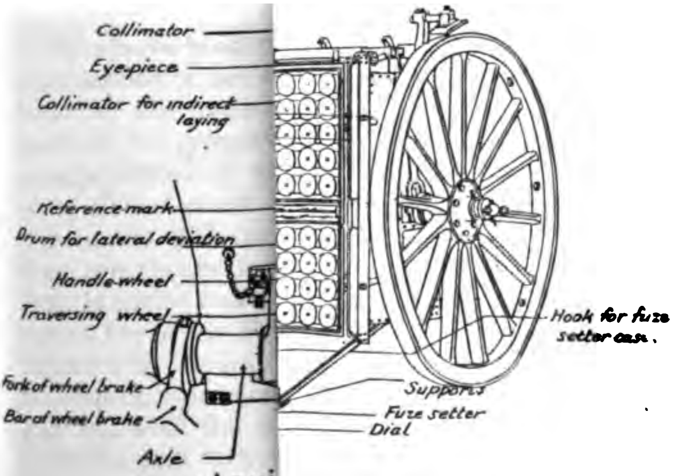




RENCH 7·5cm. RAPID-FIRE FIELD-GUN

1897

Firing



Layi

carriage of the caisson, which is placed at 50 centimeters (wheel to wheel) to the left of the piece and in line with it. The cannoneers carry carbines.

The firing mechanism is arranged for two kinds of fire. The first, or fire without sweeping—that is, without changing the aim in direction—may be executed without changing the elevation, or as a progressive fire (always with time fuze), which consists in firing two shots at each of four successive elevations, these shots being graduated at intervals of 100 meters. In the second, or sweeping fire, three shots are fired at the same elevation, the direction being changed after each shot an amount corresponding to three turns of the traversing wheel (about 1°). Sweeping fire is always with time fuze and may be executed in two ways: (*a*) At a single elevation. The aimer ceases to aim in direction after the first shot, gives three turns to the traversing wheel after this shot, and three more turns after the second. The third shot having been fired, the aimer brings the piece back to the first aiming point and then sweeps to the left. (*b*) As progressive fire. The operation is the same as in (*a*), except that the aimer does not bring the piece back to the first aiming point. For each new elevation the direction of the sweeping is changed; thus the sweep is to the left for the first and third elevations and to the right for the second and fourth.

GERMANY.

There have been reports that Germany contemplates a reorganization of her field artillery and the substitution of a new brake on the hydropneumatic principle for the spring trail spade on the present rapid-fire field gun. This would involve an expenditure of several millions of dollars and would require several years. A professional man, discussing the question in the *Kölnische Zeitung*, November, 1901, states that these reports are not correct, and that the present gun, model 1896, is entirely satisfactory. He claims that the increased rate of fire of the French gun is an advantage fully counterbalanced by the increased weight due to the brake. During the coming year experiments are to be made with the Ehrhardt gun and with the new Krupp gun, model 1901, but it is not probable that Germany will alter her field guns until the superiority of the guns with recoil on carriage is more definitely established.

The new drill regulations for field artillery contain some noteworthy provisions. The most important refer to the following points: (1) Firing over friendly troops; (2) the establishment of two artillery lines, one in rear of the other; (3) the reenforcement of an artillery line by inserting guns between those already in line; (4) use of sheltered positions; (5) the reduced battery.

A regulation for the planting of field batteries has been issued. As a fundamental principle it states that the firing of a battery should never be withheld because the protective works are not ready. The progressive construction and continuous use of these works is provided for. From 1 to 2.50 meters is given as sufficient thickness of parapet for a screened battery.

FIELD HOWITZERS.—After the field maneuvers of 1900 the Emperor ordered that the 15-centimeter howitzer become part of the field artillery and be designated the "heavy field howitzer," the 10.5-centimeter howitzer being designated the "light field howitzer."

The 15-centimeter (14.97-centimeter) howitzer is very similar to the 10.5-centimeter howitzer (Notes M. I. D., 1901). The tube is reenforced its entire length by a jacket. The carriage has the rope brake of the field gun, the hydraulic brake being abandoned because of its great weight. The maximum angle of elevation is 65 degrees; the extreme range is about 6,000 meters. The howitzer alone weighs 1,075 kilograms, and the carriage weighs 1,115 kilograms, making total weight with war equipment about 350 kilograms more than the light field howitzer. The Germans contemplate using this howitzer without any platform except some kind of light mats. The principal projectile is the high explosive shell (granatfüllung, similar to lyddite), weighing about 39 kilograms. The explosive charge is about five times as large as that in the 10.5-centimeter shell, which shell weighs 16 kilograms. The initial velocities are about equal, and it is seen that the destructive effect of the 15-centimeter heavy field howitzer compared with either the caliber or total weight of gun is much greater than that of the 10.5-centimeter light howitzer. It is even claimed that the penetrations are practically proportional to the weight of shell, that is, 39 to 16. The heavy howitzer was used against the mud forts of Peitang, China, September, 1900. It is reported that one-eighth of the field-artillery (horse batteries not included) will eventually be armed with howitzers.

GREAT BRITAIN.

A new field gun has not yet been adopted, but as a result of the experience in South Africa and the experiments at Aldershot, preference seems to be given to the Ehrhardt gun with recoil on the carriage (Notes M. I. D., 1901). The experiments have developed certain defects, such as weakness of carriage axles, which are considered due to the construction of the particular guns tested and not to any fault of the system. The *Engineer* of March 10, 1901, notes that 108 guns of this type, caliber 7.62 centimeters, made in Germany, have been delivered and issued to batteries for experimental purposes.

In table "B" are the principal data of the 7.62-centimeter Ehrhardt gun. These data differ slightly from those of the 7.5 centimeter gun given in Notes for 1901. Some other slight modifications were probably made in the guns manufactured for Great Britain.

In South Africa.—The variety of the larger guns and to what extent they were actually used in the field by the British in South Africa is seen from the following table (*Proceedings R. A. Institution*, Oct., 1901), showing number of rounds of ammunition expended by the Royal Artillery:

Period.	3-inch 12-pdr.	3-inch 15-pdr.	5-inch how.	6-inch how.	4.7-inch gun.	5-inch gun.	6-inch gun.	2.5-inch gun.	6.3 inch how.	12-pdr., naval.	12½-pdr.	9-pdr.
From commencement of campaign to Aug. 31, 1900	19,347	90,203	6,572	19	1,838	3,099	98	1,997	765	2,091	1,495	——
From Sept. 1, 1900, to Dec. 31, 1900	4,102	19,802	1,270	----	705	1,067	195	347	----	1,344	------	65
From Jan. 1, 1901, to June 30, 1901	5,515	30,671	1,288	36	330	987	15	86	----	1,758	------	72
Total	28,964	140,676	9,130	55	2,873	5,153	308	2,430	765	5,193	1,495	137

Pompom.—This gun, which is the 1-pounder 3.7-centimeter Vickers-Maxim, has been used by both the British and the Boers. One British gun is reported by the officer in charge to have been in action 41 times, under fire 22 times, and to have fired 4,544 rounds from May, 1900, to May, 1901. The pompom is automatic, has a belt feed, and can fire about 300 rounds per minute. The common shell (no steel point) with fuze in the head is ordinarily used. It is said to break up into 9 to 13 pieces. The effective range is about 3,000 yards, the extreme range about 4,500 yards. The present British establishment for one gun is 1 officer, 2 noncommissioned officers (1 for accountant), 4 gunners, 1 driver, 1 smith, 1 officer's servant, and 16 horses. For section of 2 guns double this, except the smith and the accountant. Opinions differ as to whether one gun should be attached to each regiment of cavalry or mounted infantry, or the gun or section should continue to operate as corps troops.

HEAVY ARTILLERY.—The necessity of using artillery more powerful than the 15-pounder field gun has been emphatically realized. The efficacy of howitzer fire, though disputed by some, is generally conceded. Some officers advocate a "heavy" field howitzer in addition to the 5-inch howitzer; others even maintain that howitzers and mortars are the only heavy field artillery necessary. The 5-inch gun, chiefly because of its higher trajectory, seems to be preferred to the 4.7-inch gun. The permanent organization and equipment of certain garrison artillery companies for duty as "heavy field artillery" is being discussed. The difficulties met in moving the heavier pieces over soft roads in South Africa and in China have caused to be submitted detailed plans for putting on broader tires. The question of the use of traction engines for moving heavy field artillery is also receiving attention.

MOUNTAIN HOWITZERS.—A commander of a mountain battery recommends the introduction of a 22-pounder mountain howitzer of about 4-inch caliber. He favors the ratio of one 4-howitzer battery to two 6-gun batteries, the number of pack mules to be the same in each battery.

ITALY.

In January, 1901, experiments were held at Nettuno with a battery of six of the new rapid-fire field guns. The ballistic qualities of these guns had already been tested, and these experiments were to decide in reference to certain details in the carriages, limbers, aiming gear, etc., in which the guns were purposely made different.

For the construction of the new field artillery the budget contained an item of 24,500,000 lire ($4,728,500) to be distributed over five years, 1900 to 1905. It is stated that 540 new guns (90 batteries) will be constructed and distributed to the artillery by the end of 1902. This statement may not be entirely correct, as the six guns of the battery were not exactly alike. However, new guns have been furnished to a part of the artillery and "Regulations for the service of the 7.5-centimeter rapid-fire field gun" have just been issued.

THE FIELD GUN.—The material complete is manufactured in Italy. The gun is of steel. The caliber is 7.5 centimeters and the length 36 calibers. The weight of the gun is 350 kilograms. The weight of complete piece (gun, carriage, and limber) with equipment is 1,700 kilograms, which weight is to be reduced by 100 kilograms. The initial velocity is 500 meters; the extreme range 7,000 meters.

The breech closure is an interrupted screw which is opened by giving "the handle a quarter turn to the left, then a half turn to the rear." The firing pin cocks automatically.

The recoil is taken up on the ground. The rear sight has scales graduated in degrees and thousandths. A small level gives inclination in degrees and twentieths. The aiming device for correcting the aim in direction enables the gunner to make not only the slight corrections in aim but also to follow a target shifting laterally.

Among the accessories there is an elevating arc with a level, used in verifying the aim and in measuring, if necessary, the inclination of the trunnions. This arc has a double scale—one fixed, for correcting the angle of sight, and the other movable over the fixed scale, intended to give the elevation of the piece.

The apparatus for graduating the fuzes consists of a concave metallic body in the form of a hat and provided with a lever. On this body is placed a cylinder, which can either be turned or rendered stationary by means of a thumbscrew. This cylindrical part is graduated at intervals of 50 meters and numbered every 200 meters. The upper plane part has a correcting scale. The cylindrical part has projecting in its interior a catch tooth which strikes against a button carried on the priming circle of the fuze and carries the circle along till the stop button of the graduator strikes against the fixed pin of the fuze.

The projectile is of steel with aluminum fuze and weighs 6.7 kilograms. It is intended to use a single projectile, namely, shrapnel, the fuze of which enables an accurate fire to be maintained at a distance of over 6,000 meters. Shrapnel cut at zero is used for case shot. The charge, consisting of ballistite in flakes, is contained in a metallic cartridge case. It is claimed that on limber and caisson more rounds are carried than with the French.

The service of the piece is performed by 6 cannoneers. No. 1 gives the general direction to the piece and helps No. 2 to give the exact direction. No. 2 gives the elevation, aims, and fires. No. 3 opens and closes the breech and inserts the cartridge. Nos. 4 and 5 supply ammunition to the piece. No. 6 (the chief) oversees the whole operation and graduates the shrapnel fuze. The piece is loaded while being aimed.

The several kinds of fire are: (1) Fire by command—by piece, by sections, volleys by section, volleys by battery; (2) continuous fire—by piece or by section volleys at about fifteen-second intervals; (3) battery fire—fire with different elevations, with time fuze, to sweep a zone of 100 meters front; (4) rapid fire—by piece.

HEAVY ARTILLERY.—The budget contains 9,000,000 lire ($1,737,000) to be used in replacing the 9-centimeter guns of the heavy batteries. It is desired that these guns, though they were all converted for accelerated fire in 1900, may begin to be replaced during 1903 and 1904, as the old carriages are too weak for the increased strain to which they are subjected.

A field howitzer is under study.

MOUNTAIN GUNS.—Several types of rapid-fire mountain guns are being experimented with at Nettuno, and when one is adopted its manufacture will be carried out simultaneously with that of the field guns.

RUSSIA.

After extensive experiments the Russian Government has adopted a rapid-fire field gun designed by General Engelhardt. It is officially known as the Putilof gun, from its place of manufacture. The caliber is 7.62 centimeters, and the same gun will be used by both the field artillery and the horse artillery.

"The Engelhardt carriage resembles in its general characteristics the Nordenfelt carriage; a small movable carriage fixed rigidly to the wheels. Rubber springs limit the recoil and bring the piece back to battery. A hydraulic mechanism deadens the shocks and regulates their action. This carriage is much longer than the carriage in use up to that time, in view of the initial velocity, which is no longer 450 meters but 600 meters. This length is in some way proportional to the initial velocity, to which the Russian general desires to sacrifice nothing. To avoid the fault found with Russian shrapnel, of having a feeble action at distances greater than 3,000 meters, the Russian general admits that it is necessary to increase the initial velocity and consequently to use a carriage of much larger dimensions than formerly. He gives a preference to caissons with two wheels over caissons with four wheels, claiming that with the former the same number of horses will draw one-half more projectiles than with the latter. He proposes to reduce the number of pieces of the battery from eight to six. The gun weighs 276 kilograms. The carriage weighs 1,444 kilograms. The rate of fire is 14 shots per minute. The projectile weighs 6.3 kilograms, and the limber carries 36 rounds."—*Notes on Construction of Ordnance, No. 79, U. S. O. D.*

One thousand five hundred of these guns have been constructed. Orders have been placed for 5,000 more, which are to be finished by the end of 1903. The expense is estimated at $92,700,000.

TABLE "A"—*Field artillery.*

Taken chiefly from table compiled by Capt. W. S. OVERTON, Artillery Corps, U. S. A.

Line No.	COUNTRY.	AUSTRIA-HUNGARY.[5]		FRANCE.
	Gun.	M. 75–96 (field).	M. 75–90 (horse).	R.F.M. 97 (field).
1	Caliber ... cm. (in.)	8.7(3.42)	8.7(3.42)	7.5(2.95)
2	Length of gun ... m. (in.)	2.06(81.1)	2.06(81.1)	2.74(108)
3	Number of grooves	24	24	----------
4	Twist	Right 4°	Right 4°	Increasing.
5	Maximum elevation—depression	25°—10°	25°—10°	14°—5°
6	Weight of gun ... kg. (lbs.)	437(1074)	415(915)	400(882)[9]
7	Weight of carriage ... do	621(1369)	540(1111)	760(1676)
8	Weight of limber, loaded ... do	824(1817)	732(1614)	640(1411)
9	Wheels, height of ... m. (in.)	1.37(53.9)	1.37(53.9)	1.55(61)
10	Width of track ... do	1.52(60)	1.52(60)	----------
11	Draft for one horse ... kg. (lbs.)	322(710)	281(619)	300(661)
12	Weight of caisson, loaded[1] ... do	2164(4771)	2196(4841)	2000(4409)
13	Number of men seated on piece[2]	6	None.	3 on limber.
	Battery on war footing:			
14	Guns	8	6	4
15	Caissons[3]	8(4)[3]	6(4)	12(C)
16	Other wagons[4]	5(1 res., 1 bg., 3 pr.)	8(1 res., 1 bg., 4 pr.)	----------
	Ammunition on one limber:			
17	Shrapnel	20	10	24
18	Shell	10	10	
19	Case shot	4[6]	4[6]	----------
	Ammunition on one caisson:			
20	Shrapnel	50	50	108[9]
21	Shell	40	40	
22	Case shot	----------	4	----------
23	Shrapnel, number of bullets in	250 M. 96A	250 M. 96 A	256
24	Shrapnel, total weight ... kg. (lbs.)	6.69(14.75)	6.69(14.75)	7.03(16.5)
25	High explosive shell, weight ... do	6.83(15.1)	6.83(15.1)	6.99(16.4)
26	Common shell, weight ... do	6.36(14)	6.36(14)	----------
27	Case shot, weight ... do	7.5(16.53)	7.5(16.53)	----------
28	Powder used	Ng. 2 mm.	Ng. M. '93	Nitrocellulose.
29	Weight of charge ... kg. (lbs.)	.44(.97) +.08(.18)	.44(.97) +.08(.18)	.58(1.28) ----------
30	Velocity, muzzle ... m (ft.) sec.	440(1443)[7]	440(1443)[7]	500(1640)
31	Velocity at 4,000 meters ... do	229(751)	229(751)	267(876)
	Maximum range (from fire table):			
32	Time fuze ... m. (yds.)	3599(3936)[8]	3599(3936)[8]	5500(6015)
33	Percussion fuze ... do			9000(9843)
	Danger zone for target 5.6 ft. high at:			
34	1,000 meters ... do	66(72.2)	66(72.2)	65(71.1)
35	1,500 meters ... do	37(40.5)	37(40.5)	----------
36	2,000 meters ... do	24(26.2)	24(26.2)	----------
37	3,000 meters ... do	13(14.2)	13(14.2)	----------
38	4,000 meters ... do	8(8.7)	8(8.7)	----------

TABLE "A"—*Field artillery*—Continued.

Line No.	FRANCE—(Continued).		GERMANY.			
	M. 91 (short) (field).	8-cm.(horse).[10]	M. 96 (horse).[15]	M. 96 (field).	Howitzer M. 98 (light).	Howitzer (heavy).
1	12(4.72)	8(3.15)	7.7(3.03)	7.7(3.03)	10.5(4.13)	14.97(5.9)
2	1.7(66.93)	2.28(89.76)	2.78(109.1)	2.78(109.1)	1.25(49.21)	1.646(64.8)
3	36	--------------	32	32	32	--------------
4	8°	2°	Right increas'g.	Right increas'g.	Right increas'g.	4° to 12°
5	44°—12°	--------------	16°—12°	16°—12°	40°—10°	65°
6	690(1521)	415(902)	390(859.8)[16]	390(859.8)[16]	490(1080)	1075(2370)
7	925(2039)[11]	500(1102)	454(1000)	504(1111.1)	580(1279)[18]	1114(2458)
8	890(1962)	634(1397)	795(1752.7)[17]	795(1752.7)[17]	860(1896)	--------------
9	1.55(61)	1.42(56)	1.36(53.54)	1.36(53.54)	1.23(48.43)[19]	--------------
10	1.49(57.5)	1.42(56)	1.52(60.2)	1.52(60.2)	1.52(60.2)	1.52(60.2)
11	394(869)	--------------	278(613)	287(633)	325(716.5)	--------------
12	2360(5203)	2040(4498)	1765(3891)	1780(3924)	2050(4519)	2775(6118)
13	4 or 5	None.	--------------	5	5	--------------
14	6	6	6	6	6	6
15	9 (3)	9(3)	6(3)	6(3)	6(3)	6(12)
16	3(1 res., 1 fo., 1 ff.)	3	4(2 res., 1 pr., 1 fo.)	4(2 res., 1 pr., 1 fo.)	4	6(1 ra., 1 fo., 1 ob., 1 ff., 1 bg.)
17	16	30	36	36	24	--------------
18	--------------					--------------
19	--------------	--------------	--------------	--------------	--------------	--------------
20	48 or 0[12]	76	88	88	26[20]	--------------
21	0 or 48[12]				32	--------------
22	--------------	--------------	--------------	--------------	--------------	--------------
23	627	120	300	300	500	--------------
24	20.35(44.86)	6.46(14.25)	6.85(15.1)	6.85)15.1)	13(28.7)[9]	--------------
25	20.35(44.86)	--------------	6.85(15.1)	6.85(15.1)	16(35.3)[9]	39(85.98)
26	--------------	--------------	--------------	--------------	--------------	--------------
27	--------------	--------------	--------------	--------------	--------------	--------------
28	Nitrocellulose.	Nitrocellulose.	Nitrocellulose.	Nitrocellulose.	Nitroglycerin.	Nitroglycerin.
29	.55(1.21) +.02(.044)blk[13]	.56(1.23) 470(1542)	.57(1.26)+addit'l charge of .01(.022) sm.-arm pwdr.		Variable.	.85(1.87)
30	285(928)[14]	(at 4000 yds. 816 yds.)	465(1525)	465(1525)	300(984.26)	276(905)
31	--------------		257(843.2)	257(843.2)	--------------	--------------
32	4700(5140)[14]	--------------	5000(5468)	5000(5468)	5600(6124)	6050(6616)
33	5700(6234)[14]	--------------	8000(8749)[9]	8000(8749)[9]	7000(7655)[9]	--------------
34	--------------	--------------	56(61.2)	56(61.2)	--------------	--------------
35	--------------	--------------	31(33.9)	31(33.9)	--------------	--------------
36	--------------	--------------	21(23)	21(23)	--------------	--------------
37	--------------	--------------	11(12)	11(12)	--------------	--------------
38	--------------	--------------	7(7.7)	7(7.7)	--------------	--------------

TABLE "A"—*Field artillery*—Continued.

Line No.	GREAT BRITAIN.[21]			ITALY.[27]		RUSSIA.[27]
	15-pr. M. 84-95 (field).	12-pr. M. 84-95 (horse).	Howitzer M. 96 (field).	M. 80-98 (field).	M. 74 (horse).	M. 92-95 (light field).
1	7.62(3)	7.62(3)	12.7(5)	8.7(3.43)	7(2.72)	8.69(3.42)
2	2.346(92.35)	1.695(66.75)	1.245(49)	2.05(80.71)	1.78(70.08)	2.078(81.82)
3	18	18	20	20	12	24
4	Right 0° to 6°	Rt. 1.7° to 6.4°	Right 6.4°	Left 4°	Left 3.51°	Rt. 0.5° to 4.5°
5	15.5°—8.5°	16°—8°	45°—5°	21°—10°	20°—10°	18°—10°
6	355(784)	324(715)	489(1077)	470(1037)	300(661)	448(989)
7	675(1485)	487(1073)	734(1619)	593(1308)	495(1091)	622(1371)
8	915(2016)	765(1686)	1143(2520)	880(1940)	765(1687)	557(1228)
9	1.52(60)	1.52(60)	1.52(60)	1.44(56.7)	1.44(56.7)	1.394(54.8)
10	1.57(62)	1.57(62)	1.57(62)	1.53(60.2)	1.53(60.2)	
11	324(714)	263(579)	394(869)	324(714)	260(573)	328(723)
12	2002(4413)	1585(3494)	2353(5188)	2160(4762)	1620(3571)	2050(4519)
13	4		2	5		5
14	6	6	6	6	6	8
15	6(6)	6	9	6(3)	6(3)	12(4)
16	5(1 fo., 1 st., 2 bg., 1 m.c.)	5(2 bg., 1 ff., 1 st., 1 m.c.)	5(1 bg., 1 ff., 1 pr., 1 st., 1 m.c.)	3(1 res., 1 fo., 1 ff.)	5(1 res. car., 1 res., 1 ff., 2 fo.)	9(1 res. car., 5 res., 3 pr. fo.)
17	48	46		24	32	15
18			21	8	10	13
19	4	4		4	4	2
20	110	88		72	75	40
21			45	20	20	40
22	2	2		2	2	2
23	200	156	368	176	109	210
24	6.35(14)	5.67(12.5)	22.67(50)	6.97(15.37)	4.48(9.88)	8.011(17.7)
25						
26			22.67(50)	6.76(14.9)	4.28(9.44)	6.41(14.31)
27	6.01(13.25)	5.85(12.88)		7.125(15.71)	4.1(9.04)	6.81(15.11)
28	Cordite (nitroglycerin).	Cordite (nitroglycerin).	Cordite (nitroglycerin).	Filite (nitroglycerin).	Filite (nitroglycerin).	Pyrocollodion (nitrocellulose).
29	.447(.984) Ng. +.007(.016) Nc.	.355(.777) Ng +.014(.32) Nc.	.324(.715)[22]	.45(.992)	.275(.606)	.78(1.72)
30	480(1174)	464(1523)	239(782)	448(1470)[23]	423(1388)[25]	442(1450)
31	226(741)	211(692)	177(586)	214(702)[24]	181(594)[26]	212(696)
32	3750(4100)	3380(3700)	3109(3400)	4200(4590)	3900(4270)	3400(3718)
33	5030(5500)	4755(5200)	4480(4900)	5300(5800)	4400(4810)	6400(7000)
34	57(62.3)	55(60)	17(18.6)	45(49.2)	38(41.6)	59(64.5)
35	29(31.7)	27(29.5)	10(11)			33(36)
36	19(20.8)	19(20.8)	7(7.66)	16(17.5)	13(14.2)	20(21.9)
37	10(11)	9(9.8)	3(3.28)	8(8.7)	7(7.7)	10(11)
38	6(6.6)	5(5.5)	2(2.19)	5(5.5)	4(4.4)	

TABLE "A"—*Field artillery*—Continued.

Line No.	RUSSIA—(Continued).[27] M.93-95 (horse).	RUSSIA—(Continued).[27] Mortar (field).
1	8.69(3.42)	15.24(6)
2	1.7(66.93)	1.276(50.23)
3	24	18
4	Rt. 0.5° to 7.15°	Rt.4 5° to 11.82°
5	18°—10°	47°
6	335(740)	460(1014)
7	572(1261)	820(1808)
8	815(1797)—M.79	820(1808)
9	1.394(54.8)	1.37(53.9)
10	1.56(61.37)	1.56(61.37)
11	240(602)	355(783)
12	1640(3616)	1870(4123)
13	----------	6(on limber)
14	6	6
15	12(6)	18
16	11(1 res. car., 2 res., 1 bg., 4 bg. c., 2 m.c, 1 fo.)	12(6 res. c., 1 res. car., 2 bg. 3 pr. + fo.)
17	10	12[28]
18	7	
19	3	----------
20	25	16 or 18[29]
21	27	10
22	3	----------
23	210	683
24	8.011(17.7)	31.15(68.56)
25	----------	26.8(59)
26	6.41(14.31)	----------
27	6.81(15.11)	----------
28	Pyro-collodion (nitrocellulose).	Pyrocollodion (nitrocellulose).
29	.78(1.72)	4,2,or 1 × .23(.5) + .017(.037)
30	412(1352)	232(761)[30]
31	207(679)	----------
32	3400(3718)	----------
33	6400(7000)	3400(3718)[31]
34	37(40.5)	----------
35	20(21.9)	----------
36	15(16.4)	----------
37	8(8.75)	----------
38	----------	----------

Notes.

[1] Caissons of gun batteries as well as pieces are drawn by 6 horses each in all countries.

[2] Load of limber above does not include these men.

[3] Figures in parentheses in this line give the number of caissons which with the number of guns in line above form a "fighting battery."

[4] In this line, res.=reserve; bg.=baggage; pr.=provision; fo.=forage; ff.=field forge; st.=store; ob.=observation wagons; m.=medical; c.=cart; car.=carriage.

[5] Austria-Hungary is experimenting with new artillery material. See page 82.

[6] The case shot has been replaced by shrapnel M. '96-96A with fuze cut to burst at muzzle.

[7] Velocity and other data given are for shrapnel M. '96-96A. Initial velocity for shell M. '75 is 448 (1470), for steel shell M. '75, 502 (1647).

[8] For shell M. '75 maximum range is 4500 (4920); for steel shell M. '75 it is 1125 (1230).

[9] Approximate.

[10] The 38 four-gun batteries with the corps artillery have the new 7.5-cm. guns, the 14 six-gun batteries with the independent cavalry have the old 8-cm. guns.

[11] With cradle and recoil brake.

[12] 5 caissons carry 48 shrapnel each, the other 4 carry 48 shells each.

[13] Reduced charges are .33 (.73) Nc. (nitrocellulose) +.01 (.022) blk. (black) and .22 (.48) Nc. + .01 (.022) blk.

[14] Approximate. Fire tables not yet published.

[15] Horse artillery same model as field, differing only in absence of gunner's seat.

[16] With cradle, without equipment.

[17] Without gun cradle.

[18] Without equipment.

[19] Height given is for carriage wheels, for those of limber and caisson it is 1.36 (53.5).

[20] 26 shrapnel are in the first reserve wagon.

[21] The English are experimenting with new artillery material.

[22] Reduced charges are .252 (.555) Ng. (nitroglycerin powder), .179 (.395) Ng., and .107 (.236) Ng.

[23] Velocity given is for shrapnel; for shell it is 455 (1493).

[24] For shell 5800 (6343).

[25] Velocities given are for shrapnel; for shell M. V. is 432 (1417).

[26] For shell 5000 (5468); for case shot about 400 (437).

[27] A new gun has been adopted. The guns for the complete rearmament are being constructed. See page 90.

[28] One limber carries 12 shells and 18 cartridges.

[29] Twelve of the four-horse ammunition wagons carry each 10 shells and 16 shrapnel, 6 carry each 10 shells and 18 shrapnel. Each section has a two-horse cart for bringing ammunition from wagons to mortars; this cart holds 8 rounds.

[30] This number is for torpedo shell with full charge. For shrapnel it is 220 (722) with full charge, 170 (558) with half charge, 138 (453) with quarter charge.

[31] This number is for shrapnel with full charge. For half charge it is 2150 (2351), for quarter charge 1200 (1859).

ARGENTINA.

There exist no less than six models of field artillery, including horse batteries. The six types of guns have all the same caliber of 7.5 centimeters; five of them fire shrapnel weighing 5.33 kilograms with an initial velocity of 425 meters. The greater part of field artillery of the first line is armed with modern guns, model 1898, supplied with rapid-fire obturator, system Melstrons, the patent of which was acquired from the Vickers-Maxim firm. These guns fire with an initial velocity of 460 meters a shrapnel weighing 5.8 kilograms containing 260 bullets of hard lead. The gun complete of the light batteries, without the gunners, weighs 1,650 kilograms. The gun of the heavy batteries weighs 2,000 kilograms. The caliber is 10.5 centimeters, the shells are of the Krupp system; these guns fire grenades and shrapnel weighing 16 kilograms with an initial velocity of 300 meters; the shrapnel contains 380 bullets. For the service of one light-battery gun 4 gunners are necessary, and for that of a heavy-battery gun 6. The battery commander can detail infantry soldiers for the gun carriages and require the gunners to mount the off horses. In this way the battery may contain 89 soldiers.

BELGIUM.

It is reported that Belgium has adopted the Cockerill-Nordenfelt gun. (Description of gun in Notes M. I. D., 1901.)

DENMARK.

Five million crowns ($1,350,000) for the rearmament of the artillery with a new field gun has been appropriated by Denmark. The new guns will be manufactured partly abroad and partly in Denmark.

HOLLAND.

In the summer of 1900 experiments were carried out in Holland with rapid-fire guns of the Krupp, Cockerill-Nordenfelt, and Schneider-Canet systems. The experiment board declared in favor of the Krupp gun with recoil on ground (spring trail spade). However, the action of other countries led the war ministry to order, for purposes of comparison, some guns with recoil on the carriage, so that extensive experiments will now be made with Krupp guns with recoil on the ground and guns with recoil on the carriage. Two Ehrhardt guns have been admitted to these trials.

JAPAN.

Japan has adopted rapid-fire field guns and mountain guns of the Arisaka system, a part of which have been built and assembled in the Krupp establishments; the remainder, being but partly completed, have been sent to Japan for finishing. The 600 fieldpieces made at Essen seem to have been completed. The 100 mountain guns to be built by the Schneider-Canet Company do not seem to have been completed.

GUN.—The Arisaka field gun is of 7.5-centimeters caliber and is built of steel. The breechblock can be opened in two quick movements and closed by reverse motions. It seems to be extremely simple and easily handled. The gun sits very much lower between the wheels than the usual type, the horizontal axis of the gun appearing to be in the same plane of or a little below that of the wheel axle. The recuperator consists of a pneumatic cylinder made fast to the breech of the gun and connected by two wire ropes to the carriage.

AMMUNITION.—The ammunition is shell and shrapnel; shell weighing about 6 kilograms. The round is in two parts—the brass cartridge case, containing the powder, and the projectile. Range is said to be 6,000 meters. Both time and percussion fuzes (at point) are used. There is one ammunition chest on the limber and two on the caisson. A total of 90 rounds can be carried in the three chests. They have metal lids which serve as shields when they are let down.

PERSONNEL.—The personnel of a battery is 1 captain, 3 lieutenants, something over 100 men in time of peace, and 60 horses. The war establishment is 155 of all ranks. A gun detachment consists of 6 drivers, 9 cannoneers and noncommissioned officers. Two cannoneers ride on seats on either side of the gun, and 1 noncommissioned officer and 2 cannoneers on the limber-chest seat; total of 5 suffice to serve the piece. The four other men ride on the chests of the caisson.

MEXICO.

As a result of competitive trials which have been carried out in Mexico between a field gun, heavy type, on the Mondragon system, and a field gun, light type, on the Schneider-Canet system, both 7.5-centimeters in caliber, the Mexican Government has adopted the Schneider-Canet gun. The Mexican Government has given Schneider & Co. a first order for six batteries complete, with ammunition, and has sent to France a group of officers and men, to follow the manufacture of the guns and to gain instruction in the processes of manufacture of ordnance and ammunition.—*Engineering, October, 1901.*

Mexico has a 7-centimeter rapid-fire mountain gun, Darmancier & Dalzon system (with Colonel Mondragon's modification of the breechblock) with a spring trail spade; and also an 8-centimeter mountain mortar on the carriage of the same type, both constructed at the St. Chamond establishments.

7-CENTIMETER MOUNTAIN GUN.

The mountain gun, system Mondragon (Mondragon's modification of Darmancier & Dalzon system), is of 7-centimeter caliber and throws a projectile, weight 4.35 kilograms, with an initial velocity of 280 meters per second, powder B. N. 5, and with priming, .01 kilograms of black powder (C_1) developing in the barrel a pressure which should not exceed 900 kilograms per square centimeter.

The principal parts of the gun are the barrel, the trunnion jacket, and the breech mechanism. All these parts are of St. Chamond steel, forged and tempered.

THE GUN.—The interior of the gun includes the chamber with capacity to hold a charge of 130 grams of smokeless powder in a metallic case, the cone of equalization of the chamber, the rifling, and the breechblock.

The rifling consists of 24 grooves varying progressively 2° 30′ at the initial point to 7° at the mouth.

The breechblock is composed of two threaded parts, one cylindrical and hollow in the jacket, and the other, in the form of a truncated cone, in the barrel. The threads of these two parts are interrupted and are formed by means of six threaded and six plain sectors alternating and equal to each other; the plain sectors of the truncated part correspond to the threaded sectors of the cylindrical part and reciprocally. The disposition is for the distribution of the force applied to the screw equally between the trunnion jacket and the barrel. On the left side of the block and along its whole length there is a groove provided to receive the extractor.

The trunnions of this gun are forged with the jacket. At the breech of the latter, on the left side, is the hinge of the breechblock, and on the right side the rear sight. Near the mouth of the gun on the right side is the front sight. The distance between the rear and front sights is 600 millimeters.

The total length of the gun is 15 calibers, and its average weight, including the breech mechanism, is 70 kilograms.

Breech Mechanism.—The breechblock includes the breech screw, the door with safety lock, the lever with pin and catch, the hammer, the plunger with spiral spring, and the extractor. The breech screw is in the form of a truncated cone with interrupted threads; the cylinder, through which the plunger passes, extends through the whole of the breech screw. In the rear end there are two grooves, one helicoidal, for the cam of the lever; the other, circular, to secure the immobility of the safety lock when the breech is not completely closed. The door supports and guides the screw in its rotary movement. It holds the lever, the plunger, the hammer, and the safety lock. On the left is the hinge upon which the whole breechblock turns, ending with a cam which connects with the extractor at the opening of the breech. The safety lock on the right of the door includes the lock proper and its spring. The right extremity of the lock terminates in a mouthlike shape and rests on an incline fixed on the rear end of the gun; the other extremity terminates with a half-moon, which by its spring is caused to exert a continuous pressure upon the hammer, which is thus held immovably during the working of the breech apparatus.

The lever includes the lever proper, the cam, the spring bolt, and the tumbler of the safety lock. In the lever, in addition to the cam, there is a hole through which passes the axle of oscillation of the lever, and another orifice, in the form of a truncated cone and elliptical has the same axis as the barrel in order to permit the passage of the plunger.

The cam of the breech screw is encircled by a ring of hardened steel which works in the helicoidal groove of the latter.

The handle of the lever is hollow and carries the spring catch formed by an angular lever which works on an axle which passes through the elbow of the lever. The vertical arm of the catch is continuously pressed by the flat spring fixed in the handle of the lever; the horizontal arm is provided with an envelope which extends to the socket of the door when the breech is hermetically closed.

The plunger is narrow on the side which runs along the case which contains the charge, and on the other side it has a groove into which the half-moon of the safety lock enters. The spring which surrounds it and which is set in the interior of the breech screw constantly forces it backward.

The hammer consists of an articulated lever which at one end terminates at the point at which it strikes the plunger, and at the other in a tumbler which prevents its movement if the breech is not hermetically closed. The tumbler has an orifice at the outer end through which the hook of the lanyard is passed.

The extractor consists of the rod of the extractor and the articulated clutch. The rod has a heel at the rear which rests against the cam of the door, and in front it is clamped to the clutch of the extractor which passes through a groove at the rear end of the barrel, its extremity resting upon the face of the collar of the cartridge. The smaller side of the clutch ends in a catch which, during the act of extraction, runs in the groove of the breechblock and accelerates the motion of the cartridge after having partly withdrawn it from the chamber of the gun.

To open the breech, the handle of the lever is grasped in such manner as to compress the spring of the bolt and the lever is turned from right to left. The pressure in the spring in the handle releases the hook of the bolt; the lever initiates the rotary motion around the axle; the tumbler opens the safety lock which holds the percussor, the ringed pin enters the helicoidal groove of the breech screw and causes it to make one-twelfth of a revolution. The breech apparatus then turns on the hinge of the door and the catch on the latter strikes the heel of the extractor, and the rotary motion being continued, the cartridge case is drawn out.

To close the breech the operation is reversed.

During the opening and the closing of the breech the hammer and plunger are immovable. The breechblock, the movements of which are simultaneous, consists of a small number of pieces, all simple and strong, and, therefore, apparently presents all desirable guarantees of security.

TRANSPORTATION.—On a good road the piece may be drawn by mules, but over difficult places it may be dismounted and loaded on mules. The weight of each piece does not exceed seventy kilograms and four mules are needed for its transportation, one for the gun, two for the carriage, and one for the wheels and shafts. With such light loads, a mountain gun of relatively high power may be carried over the highest and roughest places. The experiments in regard to operation and durability, made in 1898, on roads selected from the most impracticable in Mexico, gave satisfactory results with the material of this system, constructed in 1891 in the Marine Steel Works of France.

Rapidity of Fire.—The simplicity of operation and transportation of these pieces in turn promote the valuable quality of rapidity of fire. The experiments made with the new material on several practice grounds, particularly at Laugomond, near St. Chamond, have shown that the rate of twenty shots per minute, without changing the aim, may be obtained. Changing the aim at each shot a rate of from fourteen to fifteen per minute can be obtained.

The average of the active force of the gun at the mouth is seventeen (180 metric tons). If this active force is compared with the weight of the gun it shows a value of 0.246 metric tons per kilogram of the piece. This force compares very favorably with that of the heavy mountain guns in service in all other countries.

The projectiles of the Mondragon gun are of two classes, the solid shot and the torpedo shells, capable of destroying during a fire of a few minutes the strongest military field works.— ——— *Engineer of Arts and Manufactures, Paris.*

NORWAY.

An experiment board was appointed on March 30, 1901, for the purpose of carrying out firing and marching trials for two rapid-fire field batteries. One of these batteries was constructed by the Ehrhardt factory at Düsseldorf, Germany, the other by Schneider & Co. The board recommended the adoption of the Ehrhardt gun, because it fulfilled the conditions of lightness and mobility together with absolute stability during fire, and because it enabled both a rapid and well-aimed fire to be executed. The following improvements were suggested: Substitution of the Nordenfelt eccentric screw breech closure for the ogival screw; an arrangement enabling the gunner to discharge the gun by a short movement of a conveniently situated handle; increase of the weight of the gun barrel by 30 to 50 kilograms without having the weight of the piece as fired exceed 925 kilograms; shortening the carriage by 30 centimeters; employment of a spirit-level sight (Corrodi system); a revolving trail seat that may be turned inward during march; higher position of the traveling brake; such a form of trail spade as will hold equally well in hard and soft ground; more convenient arrangement of the elevating and traversing wheels; slight changes on the recoil cylinder, especially the packing; placing the limber hook farther forward. A battery of six guns was ordered for further experiments and has been delivered. For the rearmament there will be needed 132 guns, 192 caissons, 36 baggage wagons, and 24 other wagons, as well as 500 rounds of ammunition per gun. All the guns, 72 caissons, and 300 rounds per gun have been ordered of the Ehrhardt factory, while the remaining material will be constructed at home.

SPAIN.

Royal decree of February 12, 1901, approves the order for field guns and material to be manufactured by foreign firms as follows:

Krupp.—Twenty-four rapid-fire guns, caliber 7.5 centimeters, with carriages and spare parts; 432 limbers, 288 caissons, 35,280 shrapnel, 15,840 shells, 1,440 canister, 6 sets of cartridge molds, 820 kilograms of Wolff powder, 6 extra breechblocks, 2 extra hydraulic brakes, 6 sets of recuperator springs, 750 proof shots, 600 double fuzes graduated to seventeen seconds, 600 percussion fuzes, and 2,200 primers.

Schneider & Co.—Twenty-four rapid-fire guns, caliber 7.5 centimeters, with carriages and spare parts; 6 extra breechblocks, 2 extra cradles, 12 reloading machines, and 300 proof shots.

Saint Chamond and Vickers' Sons & Maxim.—Ninety-six rapid-fire guns, caliber 7.5 centimeters, with carriages and spare parts; 24 extra breechblocks, 8 brakes, 24 sets of recuperator springs, 12 reloading machines, 300 proof shots, 20,567 primed shells.

All the guns fire projectiles weighing 6.5 kilograms. The limits of weight are, for gun, 350 kilograms; for carriage, 638 kilograms. The length of each kind of gun is about 30 calibers. The initial velocities are all about 520 meters; the rate of fire from 8 to 20 shots per minute.

SWEDEN.

The trials were participated in by the Krupp factory with both systems, namely, guns with recoil on the carriage and guns with recoil on the ground; by Cockerill with a ground-recoil piece, and by the Ehrhardt firm with its type of gun recoiling on the carriage. The French firms, Schneider & Co. and Saint Chamond, which also intended to enter the competition with guns with recoil on the carriage, were left out, as they were unable to fulfill the conditions of the program. The Cockerill gun took part in all the single tests, but was not tested in battery, as the preference had been given to the Krupp material. The Ehrhardt material for tests in Sweden was to have been modified so as not to have the defects observed at the time of the Norwegian tests. When the time came the factory presented only one gun, which showed but a few small improvements, and the committee no longer considered this type.

The trials resulted in a contract between the Swedish Government and the Krupp factory for the delivery of 2 batteries for horse artillery and 120 rapid-fire guns, with the same number of caissons for the partial rearmament of the field artillery proper. For horse artillery the type of gun with recoil on the carriage has been absolutely ruled out and a carriage with spring trail spade has been adopted; for the field artillery proper the type of carriage has not yet been definitely settled and the comparative trials are still being continued.

In this contract the Swedish Government reserves the right to supply its further needs of field guns of the Krupp system by manufacturing them at home.

Numerical data referring to gun of horse artillery.

Caliber	cm	7.5
Weight of the projectile	kg	6.5
Initial velocity	m	500
Kinetic energy at the muzzle	tm	82.3
Weight of the gun	kg	350
Height of the trunnions	mm	970
Distance between wheels	mm	1,480
Diameter of wheels	mm	1,300
Weight of a piece in battery	kg	890
Weight of a piece equipped	kg	1,600
Weight of caisson loaded	kg	1,600
Number of rounds in the limber		36
Number of rounds in the caisson		92
Number of bullets in shrapnel		295
Weight of a bullet	g	11
Weight of cartridge	kg	8.2
Range at maximum elevation	m	6,600

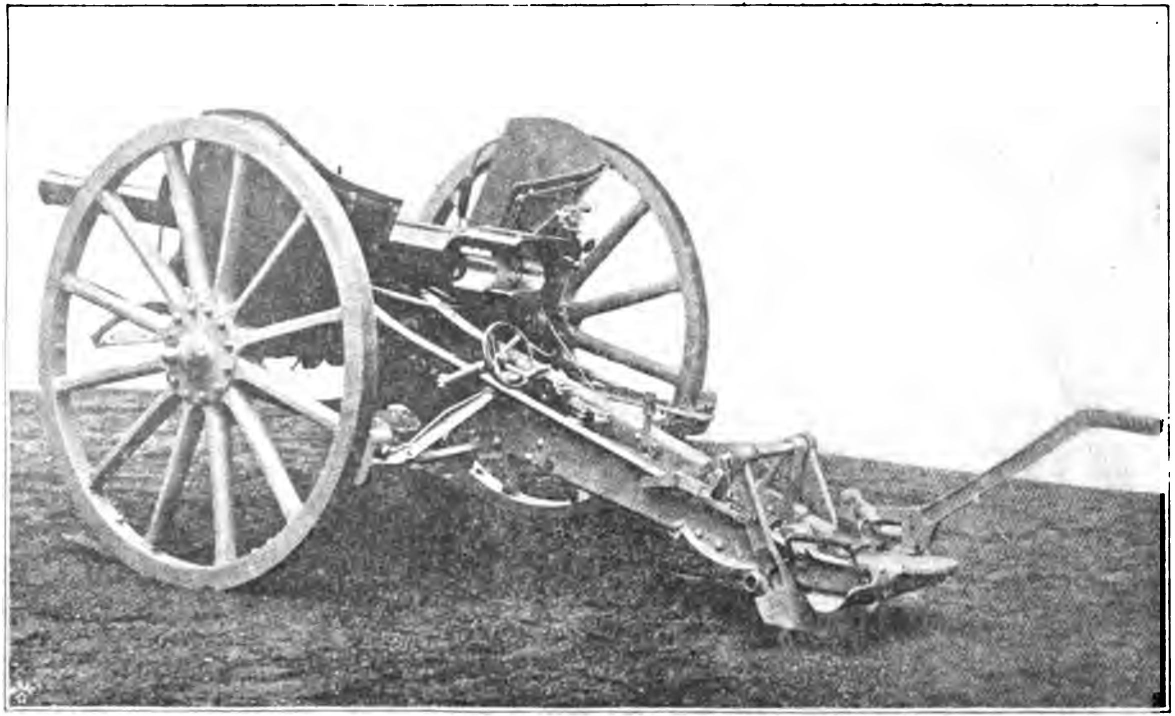


Fig. 1.—Gun adopted by Sweden for horse artillery (Krupp 7.5 cm. with spring-tail spade).

SWITZERLAND.

The committee appointed in 1897 selected for the Swiss field artillery the rapid-fire gun and the carriage with spring trail spade designed by Krupp, model 1900, but with wheels, and with the limber and the ammunition wagons constructed at the federal factories in Thun, Switzerland. In March, 1901, the Federal Council approved of this selection and agreed to a loan of 17,000,000 francs for securing the new armament. The question is still in the hands of the General Assembly.

DESCRIPTION OF THE MATERIAL SELECTED BY THE COMMISSION.

"GUN.—The caliber of the gun is 7.5 centimeters. Its length is 30 calibers. It has 28 rifling grooves; of increasing twist and right-handed. The gun is of nickel steel and is composed of a tube which is reenforced at the rear end by a jacket. At the rear end the jacket is prolonged beyond the tube and forms a breech. All the left part of the breech is cut away to facilitate loading. The rear face of the breech carries on the right side a seat for the sight. Upon the right trunnion is the front-sight holder into which the point ring sight is screwed. The chase ends with a slight muzzle swell. The sight is a clinometer sight of the Corrodi system. The sight groove is slightly inclined in order to correct the natural drift of the piece.

"BREECH MECHANISM.—The breech mechanism consists of flat wedge of Leitwell [translating roller] system. It opens to the right, which facilitates loading by the cannonier on the left. Obturation is assured by the metallic cartridge case. The lanyard is hooked before the first round, and for all the firing, in the eye of the trigger at the front of the wedge. The trigger is a repeater, that is to say, it can be armed again in case of missfire without having to open the breech. The firing-pin spring is armed only at the instance of fire. The wedge is provided with an extractor which automatically ejects the case when the breech is open. The breech is opened and closed with a single movement. It carries a safety arrangement, operated by hand, which prevents a piece which is ready for firing from being fired and also the opening of the breech. Thus the piece can be maneuvered without danger while it is loaded.

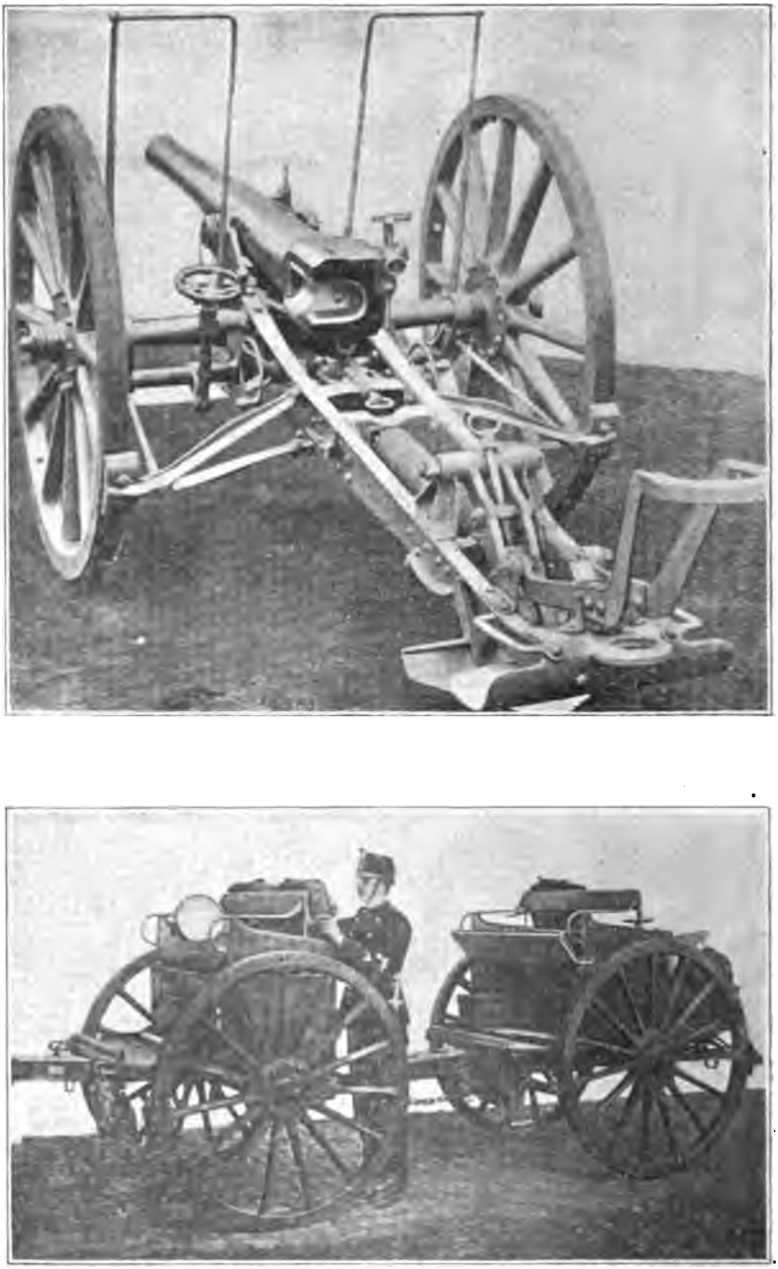


Fig. 2.—Provisional Swiss field gun (7.5 cm., Model 1899).

"CARRIAGE.—The carriage is a rigid carriage with a spring trail spade. The flasks made of steel with angle irons are connected at the middle of their length by a transom, to which is attached the rod of the column of Belleville springs, and to the trail by a large curved plate forming a sort of a shoe and provided at the rear with a lashing ring. The gun rests on the carriage by means of a small carriage pivoting around a vertical trunnion and capable of a lateral displacement of 3 degrees on each side of the axis to correct pointing in direction. This movement is controlled by a handwheel placed on the left of the carriage. The handwheel on the right serves for pointing in elevation. The carriage has a footboard, as in the present material, and two firm supports for the cannoneers standing on the footboard. The wheels are provided with a traveling brake maneuvered by a screw and handwheel on the left of the piece controlled by the cannoneer mounted on the footboard. This brake can be used also for a firing brake, if for any reason whatever the trail spade does not work. The folding spring trail spade rotates around an axis carried by two supports fixed on the flasks. In marching on very bad ground the spade is folded up under the flasks. In firing, the whole piece recoils upon the spade, which relieves itself by compressing the column of springs. Their extension causes the return of the piece to battery. The piece is served by a chief of piece and 5 cannoneers. No. 1, on the right hand, operates the breech mechanism, points, and fires; No. 2 assists him. No. 1, on the left, introduces the cartridge. The two other cannoneers graduate the shrapnel and supply the piece with ammunition. If necessary, the piece can be manned by 3 cannoneers.

"AMMUNITION SUPPLY.—The ammunition is composed of a shrapnel with metallic cartridge case, so as to form one complete cartridge. The piece likewise fires explosive shell, but the commission proposes, however, that this sort of ammunition shall not be introduced. The shrapnel is made of steel with a rear chamber The brass cartridge case with the primer at the base contains a charge of about ½ kilogram smokeless powder. The cartridge case can be used ten or twelve times. The fuze is a double-action fuze, which will probably be made of aluminum with one step, and graduations corresponding to those of the sight. Its effective range is 5,600 meters.

THE LIMBER.—The limbers of the piece and of the caisson are identical. The wheels are of the same dimensions as those of the piece. The spokes and felloes of the wheel are of wood; the nave is of iron. The chest opens to the rear. The lid folds down in such a way as to form a table. The chest contains 40 rounds packed in fours in a rattan basket in two layers of two. The cartridges are packed in jute cases. The chest carries on its rear end a crate for carrying the baggage of the personnel. Three cannoneers sit upon the chest. The footboard is provided with a foot rest. The chests of the limber and of the caisson are made of steel.

"CAISSON.—The caisson is composed of a single chest opening to the front. It contains 56 rounds in two rows of seven baskets. On each of the chests is an arrangement to receive the baggage of the cannoneers. Three men ride on the caisson. It is provided with a brake. The battery is provided with a new model battery wagon."—*Revue Militaire Suisse; tr. by Capt. W. W. Gibson, U. S. A.*

It seems that later the Council was not entirely satisfied with this gun on rigid carriage and that in November, 1901, experiments were continued.

"According to the most recent advices of the Swiss press the Federal Council has ordered, from the firm of Krupp, a battery of 4 guns with recoil on the carriages, of the same type as that experimented with in the comparative trials held in Thun from the 4th to the 15th of November, 1901. The committee was unanimously in favor of making further tests with this type. The other types represented, such as Schneider-Canet, Nordenfelt, and Ehrhardt, are given no consideration. During 1902 a five-week course of experiments will be held with the new Krupp battery. The principal object of the experiments will be a comparison of the guns of this battery with those on carriages with spring trail spades primarily approved by the Federal Council. Not until these experiments have been concluded will a definite decision be reached as to whether the gun with spring-trail-spade carriage or that with recoil on the carriage shall be given preference."—*Jahrbücher für die Deutsche Armee und Marine, January, 1902.*

THE BOER FIELD GUN.

This is a 7.5-centimeter Schneider gun, model 1897. It has 24 grooves. There are no trunnions. Ridges on the jacket hold the gun in place and allow it to slide back and forth in the cradle. Various projections serve for the attachment of the recoil cylinders and the recuperator, and for giving the gun a small amount of lateral deflection without moving the carriage. A sight plane on the breech for the quadrant is provided for long ranges or indirect fire.

The breech mechanism is the interrupted screw. Fixed ammunition in brass shells is used. The ejector and firing pin are automatic.

The cradle in which the gun slides, being pivoted on the carriage axle, can be elevated or depressed by means of the toothed sectors worked by worm gear. This cradle carries the recoil cylinders filled with glycerin, and the recuperator springs. The recoil of the whole carriage is checked by the spade, which has a spring that brings the carriage forward after each firing. The wheel brake can be used to check the recoil on hard ground where the spade would not act.

In the carriage there are some features noticeably different from the ordinary model; the width of track is less, about a foot, and the axis of the gun is lower, also nearly a foot. The sides of the trail are further apart, which throws the strain on the axle nearer the points of support. There are no seats by the sides of the gun.

The low position of the gun necessitates long sight bars. The front sight and the holder for the rear sight are both removable and are held in place by springs. The rear sight is raised by a rack and pinion, and has a deflection leaf; a spirit level is attached. For indirect firing a serviceable strong quadrant is used for elevation. It reads to minutes by moving a runner along the radius bar. A plumb line is used for direction if the object or the line of sight can be seen; otherwise the direction scale is used.

The projectiles are common shell, shrapnel, and case shell. A time fuze, a percussion fuze, or a time-percussion fuze is used. The fire-composition tube is a lead tube wound spirally near the outside of the coned ring. There is no safety pin, a spiral spring keeps the striker from the percussion cap during ordinary jolts due to handling.—*The Engineer, London, April, 1901.*

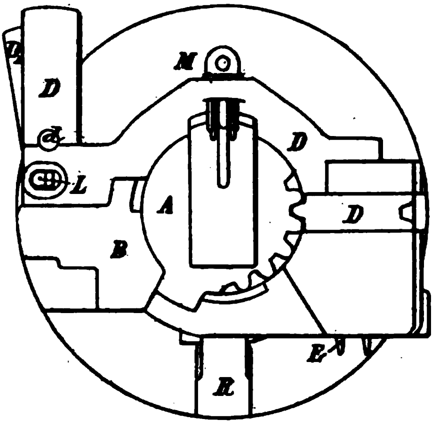
THE DARMANCIER AND DALZON SYSTEM (SAINT CHAMOND).

(From *Revue d'Artillerie*.)

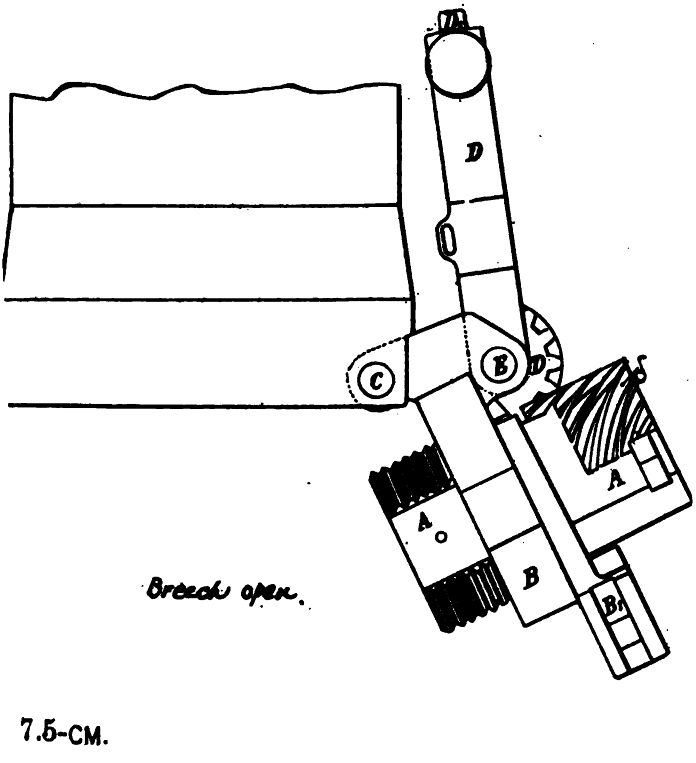
7.5-CENTIMETER FIELD GUN, MODEL 1900.

GUN.—The gun is provided with an interrupted screw breech mechanism. In the rear part of the screw (fig.) are cut a denture, δ, for the sixth of a revolution; a groove for the bolt B, which serves to guide the screw in its movements; a notch and a central cavity serving as a seat for the firing mechanism. The carrier ring B carries the bolt B_1, the axis E of the operating lever, the hinge pin C, and a circular groove to insure against a premature discharge. The operating lever D, movable about the axis E, is provided with a handle, and with a pinion which engages in the denture δ. (The helicoidal denture δ and the pinion have been replaced in the latest types of breech by a double conical denture). The handle carries a spring latch D_1, hinged at d and upon which pressure is exerted during the movement of opening, in order to disengage from the breech screw the bolt B, which causes the breech screw to form one rigid piece with the carrier ring. The firing mechanism consists of the striker F, its spring G, the compression piece H of the spring, and the trigger and sear J. The ejector K consists of a metallic piece in the form of hollow tile, adjusted on the smooth inferior sector of the breech bushing; in front a vertical rib, v, constitutes a purchase for the ejector against the rim of the cartridge case. At the rear a heel, θ, fits over the extremity of the ejector lever K_1. The latter, held by the hinge pin of the carrier ring and guided in a bearing, R, attached to the rear face of the gun, receives, at the conclusion of the opening movement, a vigorous oscillating movement produced by the shock of the carrier ring. The result is an accelerated rectilinear displacement of the ejector toward the rear, which effects the expulsion of the cartridge case. The safety device in case of hang-fire (L), based on the inertia of a weight in the gun tube, prevents the latch D_1 from turning about its axis d when the shot has not gone off; the opening of the breech is, consequently, rendered impossible. However, L can be pushed by the hand to the position which it should normally occupy after the discharge in order to enable the breech to be

Plate III.



Breech closed



Breech open.

7.5-CM.

opened. During changes of position of the loaded piece the operating lever *D* and the trigger and sear *J* are rendered immovable by a safety key, *M*. The breech is opened in one move by causing the operating lever *D* to undergo a simple rotary movement from left to right in a plane perpendicular to the hinge *C*.

CARRIAGE.—The carriage comprises: (1) A chassis of sheet iron containing the traversing and elevating gear, the axle seats, the road brakes, and two seats on which are seated, during fire, the cannoneers serving the breech; (2) a cradle with hydraulic brake, and spring recuperator for return into battery; (3) a guide sledge fastened to the gun and connecting it with the movable part of the hydraulic brake.

Lateral deviations can be made by means of the aiming gear. The two aiming levers are placed within the reach of the gunner, who can operate them simultaneously with the act of loading. A rate of fire of 20 to 25 shots a minute is said to be attained.

AMMUNITION SUPPLY.—The limber of the gun or of the caisson contains 36 rounds, the equipments, and spare parts. The projectiles form, with the cartridge cases, complete cartridges arranged by fours in sheet-iron boxes. The rear carriage of the caisson contains 56 rounds arranged in boxes identical with those of the limber chest.

10.5-CENTIMETER FIELD HOWITZER, MODEL 1900.

The 10.5-centimeter rapid-fire field howitzer is constructed on the same principles as the gun just described. The carriage is provided wtth a hydraulic brake with spring recuperator. The arrangement of this piece allows seats to be placed on the right and left of the carriage for the cannoneers. Vertical levers attached to the axle near the naves of the wheels serve as supports for cannoneers, who can thus be transported rapidly for short distances.

By the aid of a level and an alidade placed on the left side of the carriage, the aiming is done during the act of loading On the left side, a device independent of the elevating gear enables the howitzer to be brought very rapidly from its firing to its loading position, and vice versa, without the gunner's operating the elevating crank, i. e., without disturbing the original aim.

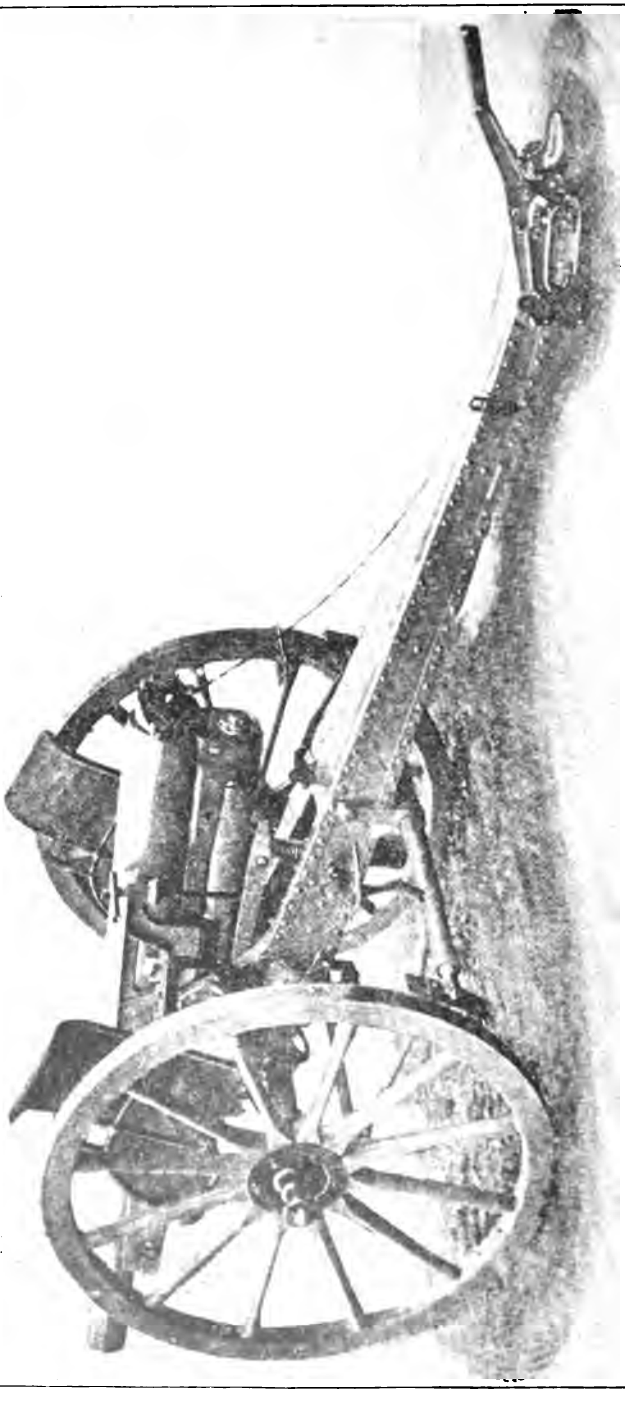


Fig. 3.—Darmancier and Dalzon (7.5-cm. rapid-fire field gun).

The howitzer fires projectiles weighing 12 or 14 kilograms (shrapnel, shell, or torpedo shell containing 2 or 2.8 kilograms of explosive). The smokeless powder, contained in a brass cartridge case, is divided into three partial charges, viz, one of 200 g., one of 120 g., and one of 60 g. This enables four different loads to be obtained (380, 320, 260, and 200 g., imparting to the 12-kilogram projectile the respective velocities of 320, 285, 250, and 205 meters).

MOUNTAIN ARTILLERY.

7-CENTIMETER GUN.—This gun has the one-motion breech closure, and a spring trail spade. Four pack mules carry the piece complete. Weight of gun is 73 kilograms; of carriage, 286 kilograms; of shell, 4.3 kilograms. Initial velocity is 300 meters per second; rate of fire, 10 to 12 shots per minute.

7.5-CENTIMETER GUN.—There are two types of this gun; one on carriage with telescopic trail, the other on carriage with spring trail spade. The breech closure for the first type requires two motions, for the second type one motion. The gun rests on a cradle fastened to the chassis on a vertical pivot at the rear and by a circular flange working in a corresponding groove at the front. This allows lateral movement sufficient to correct the pointing. The traversing gear is on the chassis, the crank being on the right side and in rear of the crank of the elevating gear, which gear is on the cradle. For the first type there is a hydraulic brake with a recuperator spring. The brake piston rod is fastened to the carriage axle, the cylinder is fastened to the trail spade. The field guns before model 1899 had this brake. For the second type the brake is similar to that of the field gun of model 1899. Four mules carry either piece complete.

The ammunition is in brass shells. Percussion fuzes and time-percussion fuzes are used. Boxes, each holding seven shells, are prepared for pack transportation. The limber, when it can be taken, carries seven boxes, each containing five shells.

8-CENTIMETER MORTAR.—The weight of the mortar is 73 kilograms; carriage, 335 kilograms; projectile, 6.5 kilograms. Initial velocity is 210 meters per second; rate of fire, 10 to 12 shots per minute. [*El Boletin Militar* gives for mortar made for Mexico, weight 71 kg., weight of carriage 262 kg. The range is reported to be 3,800 m.]

THE KRUPP RAPID-FIRE FIELD GUNS, MODEL 1901.

RECOIL ON THE CARRIAGE.

(From *Revue Militaire Suisse.*)

THE FIELD GUN.

The Gun.—The gun is of nickel steel. The caliber is 7.5 centimeters. The length (30 calibers) and interior construction are identical with those of the 7.5-centimeter Krupp gun tested last year in Switzerland. The jacket of the gun extends over the breech, covers the whole length of the chase, and has no trunnions, being provided with three pairs of guide claws which enable the gun to slide on the cradle during recoil and return.

The breech closure is of the system sometimes called Leitwell (horizontal wedge with translating roller), and has a repetition-firing mechanism, whereby the piece may be discharged by the gunner seated on either the right-hand or the left-hand seat. This firing mechanism and the sighting device are attached to the cradle and not to the gun.

During fire the gunner makes the slight corrections in aim while the gun is returning forward from recoil.

The Cradle.—The cradle consists of a long trough of sheet steel of quadrangular section . The roof carries laterally two guide ribs along which the gun slides. The interior of the trough carries the cylinder of the brake, as well as the spring recuperator.

The hydraulic brake consists of the cylinder, the piston, and the piston rod. The brake cylinder is connected with the breech by means of a screw which passes through a flange attached to the lower face of the breech. Upon discharge, the piece, in its recoil, carries along the cylinder, while the piston rod, attached to the cradle, remains stationary. The liquid contained in the cylinder passes through narrow orifices in the walls of the cylinder, from the rear to the front of the piston.

The return to position is accomplished by the recuperator spring, a simple spiral spring in three pieces disposed freely about the brake cylinder. This spring receives an initial tension. The return of the gun into position is rendered less sudden toward the end of its course by having the diameter of the orifices through which the liquid flows reduced for

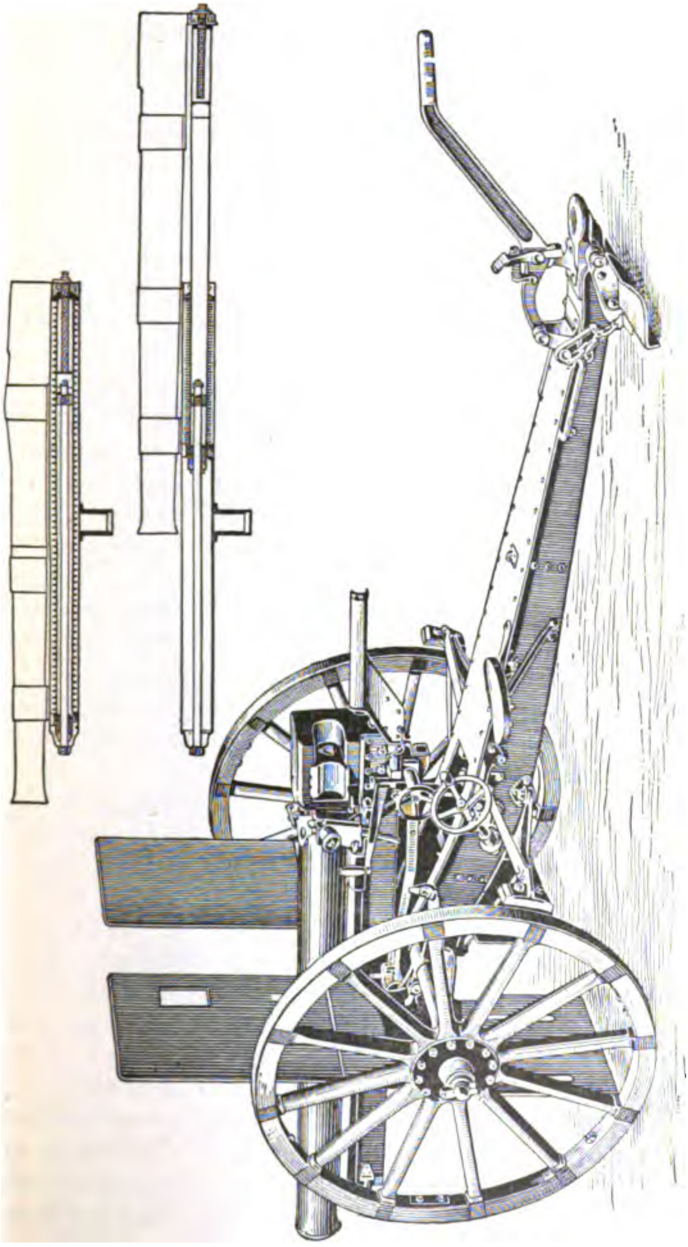
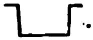


Fig. 4.—Krupp 7.5-cm. rapid-fire field gun, Model 1901 (recoil on carriage).

the last 5 centimeters. The brake cylinder contains but one air-tight fitting. This fitting is easily accessible by simply removing the cap which fits over the front end of the cradle. All parts of the brake and recuperator, as well as the guide ribs of the cradle, are completely closed on the outside.

The firing mechanism works even when the gun has not yet returned completely into position, but will not work if the distance remaining to be traversed is over 8 centimeters.

The cradle rests on the cradle support through the medium of a vertical trunnion which allows small lateral deflections. The cradle support rests, by means of two horizontal trunnions, in the trunnion beds of the lower carriage. It is connected to the cushion of the elevating gear.

THE CARRIAGE.—The trail of the carriage is of steel, in one piece, press-cast, like that of the experimental battery of 1900. Its shape is thus: . The cheeks converge toward the rear and are covered with a plate of sheet iron riveted.

The spade is constructed for being lowered at will; it works, however, during fire, like a simple stationary spade. The trail has on the left a seat on which the gunner sits during the firing. In order that the gunner may not be struck by the breech during the recoil of the gun, a "protective arm" is fixed at the back of the cradle. A second seat, identical with the one just mentioned, is situated on the right of the trail for the cannoneer attending the breech mechanism. This seat can be easily removed.

The piece is provided with shields. In the model to be submitted to the Swiss board the shields will be removable. These shields, made of sheet steel, consist of two parts, namely, the upper shield, in one piece, fixed solidly to the arms of the footboard; and the lower shield, joined by hinges to the body of the carriage, under the axle. During marches the lower shield is raised and hooked to the cheeks. The shields measure altogether 1.46 meters in height. Fig. 4 shows the shield of a gun which is provided with axle seats. The shields of this piece are transformable, so that they constitute at once both shields and seats. Each shield is formed of three sheet-iron plates hinged together. By seizing with one hand a catch located on the back of the shield the latter can be unfolded or let down at one move. The middle part of the shield forms the seat proper, the upper part the back of the seat, and the lower part a rest for the legs. The shields

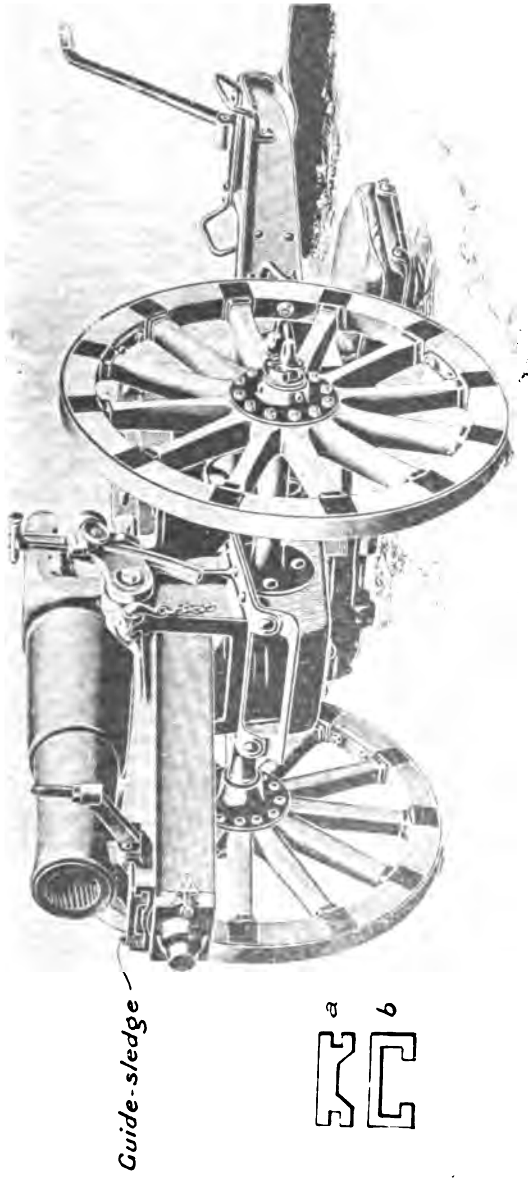


Fig. 5.—Krupp 7.5-cm. mountain gun, Model 1901 (recoil on carriage).

unfolded have a height of 1.72 meters; closed as seats, 1.375 meters. The left-hand shield in Fig. 4 has a window near the top to permit aiming when for any reason the shield is not unfolded. The sheet iron of the shields is of a thickness calculated to resist infantry bullets at 400 meters distance.

The other parts of the piece, i. e., the aiming gear, axles, and wheels, and the limber and ammunition, are similar to those of the Krupp 1900 battery tested in Switzerland.

THE MOUNTAIN GUN.

The gun is nickel steel, caliber 7.5 centimeter, length 14 calibers. The jacket extends for about two-thirds the length of the chase and receives the breech mechanism. The method of connecting the gun and the cradle is the only essential difference between this gun and the field gun. The gun does not rest directly on the cradle, but on the guide sledge, to which it is fastened by a hook-shaped flange on the chase in front and a square projection from the chase near the breech. There is a hole in this projection for a key wedge.

The section of the guide sledge is seen in the figure (*a*). In future guns the section will be as (*b*)

The dismounted gun complete is carried by 4 mules.

TABLE "B."—*Field Artillery*.

Gun.	Ehrhardt, 1900.	Swiss provisional.	Darmancier and Dalzon.		Krupp, 1901.	
			Field, 1900.	Mountain, 1899.	Field.	Mountain.
Caliber ....cm..	7.62	7.50	7.50	7.50	7.50	7.50
Length in calibers..................	30	30	30	15	30	14
Number of grooves..................	28	28			28	28
Weight of gun..................kg	375	350	360	100	372	105
Weight of carriage..................kg..	530	558	640	260	595	282
Weight of projectile ....kg..	6.50	6.35	6.50	6.50	6.36	5.35
Initial velocity..................m. sec..	500	500	520	275	484	275
Shots per minute..................	16	10	23	13	24	7

IV.—MACHINE GUNS.*

[COMPILED BY CAPT. J. S. HERRON, SECOND CAVALRY.]

The practical machine gun dates from the primitive type of Gatling used in the war of secession and the Reffye mitrailleuse secretly manufactured in France prior to the war of 1870, and until quite recently was limited in caliber to small-arm ammunition. The 1-pounder Maxim machine gun, now more familiarly known perhaps as the "pompom," is the first machine gun of caliber ever used in the field. By "machine gun of caliber" is meant a machine gun throwing an explosive shell whose weight is just low enough to allow of the narrowest margin permissible by that clause in the St. Petersburg Declaration of 1868 which enjoined that no explosive projectile less than 14 ounces in weight would be tolerated in civilized warfare.

---

*AUTHORITIES CONSULTED.

Allgemeine Schweizerische Militär-Zeitung, 1901.
Armée et Marine.
Arms and Explosives, London.
Artilleriski Zhurnal, St. Petersburg.
Bulletin de la Presse et de la Bibliographie Militaires, Brussels.
Cavalry Drill Regulations, 1898, London.
De Militaire Spectator, Haarlem.
Feuille Militaire Fédérale (army orders), Berne, 1898.
Heere und Flotten der Gegenwart, Berlin.
Indisch Militair Tijdschrift, Batavia.
Internationale Revue, Dresden.
Jahrbücher für die Deutsche Armee und Marine, Berlin, 1901.
Journal of the United Service Institution of India, Simla, 1901.
Journal Royal United Service Institution, London.
La ametralladora automática Hotchkiss, Paris.
La Belgique Militaire, Belgium.
Mexico Militar, 1901.
Militaert Tidsskrift, Copenhagen.
Navy and Army Illustrated, London.
Regimental Establishments, etc., 1901–02, London.
Report of the Secretary of War and Navy for 1900–01, Mexico.
Report of the War Department, 1900. Report of the Chief of Ordnance, Washington.
Reports of United States Military Attachés.
Revue d'Artillerie, Paris.
Rivista de Artiglieria e Genio, September, 1901.
Revista Militare Italiana, Rome.
The Engineer, London.
Ueberall, Berlin, 1901.
Various German and other newspapers.
War Establishments, 1898, London.
And others.

As some confusion has existed in regard to the names "rapid-fire" gun and "machine gun," the following definitions may not be out of place: A rapid-fire gun is one with a rapid breech action, simplified ammunition, continuous laying sights, recoil-absorbing mount, and device for automatic and instant replacement of gun after discharge in the firing position. It may be fired either by lanyard or trigger and never has more than one barrel. It is entirely under control of the layer, who trains, elevates, and fires it. Rapid-fire guns are of all sizes from the 1-pounder and 3-pounder to the 6-inch, firing a 100-pound projectile, and even to the 8-inch.

A machine gun is one that is loaded and fired by machinery, that is, by a mechanism operated with a crank or handle, or by automatic utilization of the energy of recoil or a part of the energy of the powder gases. Machine guns are of all sizes, from the small-arm calibers to 1-pounders and even 3-pounders and 4-pounders.

A rapid-fire gun is distinguished from a machine gun chiefly by the fact that the former is loaded by hand. In both cases the recoil is absorbed, and when utilized, in the case of the machine gun, it is to continue the loading and firing operations; in that of the rapid-fire gun, it is to return the piece to the firing position.

From 1862 to 1882 machine-gun mechanisms were operated by hand, and it was only after the latter date that they were rendered automatic.

Machine guns whose mechanisms are operated by hand may be divided into two groups, the first comprising machine guns with revolving barrels, and the second machine guns with a fixed barrel or barrels.

To the former group belong:

1. The Hotchkiss revolving cannon, which, though firing real artillery projectiles of 37, 47, and 53 millimeters caliber, is classified as a machine gun. It consists of an assemblage of five barrels revolving about a central axis, and of a single lock. The feeding is done by means of a single feed trough.

2. The Gatling gun, which fires small-arm cartridges at the rate of 1,000 shots per minute, is composed of six, eight, or ten barrels turning around a common central axis and having as many locks as there are barrels. By a special device the dispersion of the bullets is effected during the rotation of the barrels. The gun is fed by means of a hopper and carrier

Machine guns with fixed barrels may be divided into two classes, viz, those with the barrels arranged concentrically around a central axis and those whose barrels are in the same plane. To the first of these classes belong:

1. The Reffye machine gun, composed of twenty-five barrels and firing 150 shots a minute in volleys of 25 shots each. The weight of the bullet is 54.2 grams. It was placed in service in France in 1870. It is provided with a special device for sweeping fire. The feeding is accomplished by means of boxes containing 25 cartridges each. The mechanism comprises twenty-five breechblocks, the firing pins of which are released by the motion of a plate with perforations suitably arranged. The carriage weighs 880 kilograms and the limber 600.

2. The Belgian machine gun, Montigny, having thirty-one barrels, each with a breechblock, the firing pins of which are released by the motion of a special plate moved by a lever which acts at the same time on the traversing gear. The gun is fed by means of cartridge plates.

Among the machine guns having the barrels arranged in the same horizontal plane are:

1. The Swedish Palmcrantz machine gun, composed of ten barrels. The firing mechanism is operated by a horizontal lever, and the gun is fed by means of a magazine containing 250 cartridges and a carrier. It is possible to fire, by volleys, 500 shots per minute. Dispersion is obtained by a special device.

2. The Gardner machine gun, with two barrels. The firing mechanism is operated by means of a crank, and the feeding is effected by means of a vertical feed guide receiving the cartridge, and a carrier. A continuous fire of about 400 shots per minute can be executed.

3. The Nordenfelt naval machine gun, with four barrels of 25 millimeters caliber, operated by means of a lever. The feeding device consists of a hopper covering the breech of each barrel, and a carrier.

Automatic machine guns are divided into two groups, the first comprising those actuated by the effect of the recoil of the barrel or of the breech, and the second those in which the gases act directly on a piston connected with the mechanism. Among the machine guns utilizing the effect of the recoil may be cited:

1. The Maxim machine gun, the first as to date (1882), characterized by the following points: (*a*) Upon the shot being fired the barrel and breech recoil. After recoiling a short distance the breech, leaving the barrel, which stops, continues its journey and moves the whole mechanism. A recuperator spring produces the forward movement and the discharge of the piece. (*b*) The cartridges are arranged on a flexible feed band, from which they are removed one by one automatically and placed in a carrier which conveys them up opposite the chamber. (*c*) The barrel is surrounded by a water jacket. (*d*) The rate of fire is about 600 shots per minute.

2. The machine gun of Archduke Charles Salvator and Major von Dormus, called the Skoda machine gun, adopted in 1893 by Austria-Hungary. It operates as follows: Upon discharge the gases drive back the breech piece, which carries along with it the empty shell. At the same time a pendulum is thrust to the rear, while the breech is being opened, the shell ejected, and the firing mechanism cocked. Finally, when the pendulum returns forward, a cartridge is inserted in the chamber, the breech closes, and the shot goes off. The pendulum serves besides to regulate the rate of fire. The cartridges are placed in a feed trough provided with a distributer, from which they fall into a hopper which conveys them to the chamber. The barrel is surrounded by a water jacket. This gun fires about 300 shots per minute.

3. The Nordenfelt machine gun, model 1897, which has the following features: The recoil of the barrel and breech actuate a cam which acts on the whole mechanism. A recuperator spring then brings back the mechanism to the cocked position and discharges the gun. The cartridges are placed in a flexible band which is carried along on a cylinder with six cogs. A carrier introduces them into the chamber. The barrel is surrounded by a water jacket. The rate of fire is from 500 to 600 shots per minute.

The following machine guns utilize the action of the gas on a piston connected with the mechanism:

1. The Hotchkiss machine gun, characterized as follows:

The gun consists of a single barrel screwed into the front of the receiver, which contains the operating mechanism; below the barrel and parallel to it is secured a hollow cylinder, which is in communication with the bore through a port drilled through the barrel about 16 inches from the muzzle. Contained in this cylinder is a piston, on which are formed suitable cams for operating the breechblock, the firing mechanism, and the feed mechanism. On discharge, as soon as the bullet has passed the port connecting bore and cylinder, the powder gas enters a chamber in the front end of the cylinder and throws the piston to the rear, where it is held by a sear. The piston engages with the breechblock, and by its motion opens the breech, extracts the fired cartridge case, and brings a fresh cartridge to the loading position. By pulling the trigger the piston is released, and as it moves forward under the action of the mainspring it pushes the cartridge into the chamber, closes the breech, and fires. The cartridges are carried in flat brass feed strips, containing 30 rounds each, and having a length of about 15 inches. Each feed strip is packed in an ordinary pasteboard box. The feed mechanism consists of a feed wheel which engages in cams cut in the piston, and the teeth of this feed wheel register with openings formed in the feed strip. Each backward and forward motion of the piston brings a fresh cartridge in line with the chamber, ready to be pushed home by the breechblock and fired. The gun is cocked for the first shot by drawing the piston to the rear by means of the cocking handle, thus compressing the mainspring and withdrawing the breechblock. The piston being held in its backward position by a stop, the gun is ready for loading. The gun is loaded by pushing a feed strip with cartridges into the feed block. The openings in the strip engage with the teeth of the feed wheel, which is now secured by the pawl engaging with the ratchet; thus the first cartridge is held in position preparatory to the operation, which brings it in line with the chamber and frees it from the strip. The stop which arrests the piston at the end of its backward motion is pressed down by the feed strip and thus thrown out of action. This allows the piston to move forward a short distance, where it is held by the trigger which engages with the sear. On pressing the trigger the piston is released, and under the action of the mainspring is propelled forward, carrying with it the breechblock; this, in moving forward, pushes a cartridge out of the feed strip into the chamber. When the cartridge is home the locking cam on the piston body brings the locking dog of the breechblock to bear against the recoil blocks in the receiver, and the firing pin is driven against the primer by the tang on the piston, thus exploding the cartridge. After the bullet has moved forward and passed the port connecting the bore with the cylinder, the powder gas drives the piston to the rear, withdrawing the breechblock with its extractor, and ejecting the empty cartridge case. The piston is now held by the trigger, the mainspring is compressed, and the gun is ready for the next shot. The teeth of the feed wheel being engaged in the feed cams cut in the piston stem, each backward motion of the piston turns it one tooth and draws the feed strip forward, bringing another cartridge to the loading position. If the trigger be held back, the piston is free to move forward again under the action of the compressed mainspring, and the fire will be kept up continuously and automatically until the supply of cartridges in the strip is exhausted. The feed strip, having been exhausted, falls to the ground, and the stop which it held down rises and holds the piston in its backward position, independently of the trigger. In case of a missfire, the gun must be recocked by pulling back the cocking handle; the defective cartridge is ejected by this motion and the firing may then be continued. If it be required to withdraw a partially expended feed strip, the pawl is released from the ratchet of the feed wheel by pulling the handle; the feed wheel is then free to turn backward, and the strip may be withdrawn.

A safety device is provided by which the piston may be locked in position, either when the breech is opened or closed. The action of the mechanism depends in great measure on the pressure of the powder gas in the cylinder. The pressure may be increased by screwing in the regulator, or decreased by unscrewing the same. This varies the capacity of the cylinder chamber, and, consequently, the pressure. The gun is fitted with a shoulder piece or stock, and a pistol grip and trigger for controlling the fire. Two men are required to work the gun, one to load and the other to fire. The rate of fire is about 400 to 600 shots per minute.

2. The Colt machine gun, characterized by the following points:

A small radial vent 0.065 inch in diameter in the barrel, somewhat in rear of the muzzle, opens downward from the bore, this vent being closed by the piston which fits in the gas cylinder surrounding the outer end of the vent. The piston is pivoted to the gas lever, which is hung in the bracket on the horizontal pivot so as to swing thereon in a vertical plane below and parallel to the barrel; two tubes under the barrel contain spiral springs which are connected by a T rod and links with a short crank arm of the lever in such a manner that the spring yieldingly holds the gas lever in the position, with the piston closing the vent. At a point between the piston and the pivot of the gas lever a rod connects it with the slide, which, guided below the barrel, extends rearward beyond the latter, and is there connected with the breech bolt. The breech bolt is arranged so as to move backward and forward in opening and closing the breech, and in the forward position the rear end of the breech bolt swings downward, turning on the front end as a fulcrum; and in this position it is sustained by abutments in the receiver.

A central rib of the breech bolt depends into a slot in the rear end of the side and the pin passes through the slide and through the diagonal slot in the rib, and, connecting the breech bolt with the slide, causes the latter as it moves rearward, first, to raise the end of the breech bolt, thereby unlocking it; then to move it rearward, opening the breech, while the forward movement of the slide moves forward the breech bolt and finally forces its end down, thus closing and locking the breech.

In the rear of the breech bolt a hammer is arranged, the stem of which and the mainspring in which are guided in an extension which closes the breech casing and to which the handle and the trigger are attached; this hammer is used also as a piston for the air pump which forces a strong jet of air into the chamber and through the barrel, removing all particles of unburnt powder immediately after the empty shell is extracted. As the bolt moves rearward it forces back the hammer. The trigger and a sear hung by the side of the trigger serve to retain the hammer until the breech is again closed and locked, when the hammer may be released by a pull on the trigger; a connection between the slide and the sear serves to release the hammer automatically each time the breech is closed if the pull on the trigger be continued. By this means either a few shots or continuous rounds may be fired.

The feed belt is entered through an opening in the left side of the gun and the cartridges in it pass successively over the feed wheel, which is rotated by the slide and the levers, so that at each stroke of the slide one cartridge is presented in front of the extractor attached to the slide, and by it the cartridge is drawn rearward onto the carrier, pivoted below the breech bolt. The empty feed belt passes from the gun through the opening in the right side of the gun, while an extractor on the breech bolt serves to extract from the chamber the empty cartridge shell, and an ejector throws out the shell through the opening on the right side of the receiver.

The rear end of the carrier is provided with a spring dog, which yields to the slide in its rearward movement and causes the first of the forward movement of the slide to raise the front of the carrier and to present the cartridge thereon to the breech bolt, by which it is pushed into the barrel. A firing pin in the breech bolt, so located that it can be struck by the hammer only when the breech bolt is firmly locked, transmits the blow from the hammer to the cartridge. A safety lock is provided which securely locks the hammer and prevents the same from striking the firing pin. This is to be used only when a loaded cartridge is left in the chamber. The rate of fire is from 500 to 600 shots per minute.

The machine guns now in service are chiefly automatic ones. The automatic gun is fired either deliberately or rapidly. The gun usually rests on a tripod mount with a fork pivot forming a universal joint, being aimed either from the shoulder or by the aid of a special apparatus, and is traversed so as to disperse the fire. The weight of a machine gun is generally less than 66 pounds and that of the mount less than 44 pounds.

AUSTRIA-HUNGARY.

According to v. Löbell's report for 1874, 20 machine-gun batteries of 4 guns each, of the Christoph Montigny type, formerly existed in the Austro-Hungarian army. They were distributed among the Hungarian landwehr troops, in time of peace, and designed to be added to infantry divisions in time of war. For several years the question was not discussed, but numerous experiments took place, several propositions having been made with a view to furnishing the troops in the field with machine guns.

In 1887 experiments were begun in Austria with the Maxim machine gun, but they were made only with a view to the use of these guns in fortresses.

In 1890 experiments were undertaken with the Skoda machine gun invented by Charles Salvator and Major von Dormus and patented by Skoda, this arm being adopted in 1893 for use with the cavalry in the field. Up to 1898, however, it had not been introduced throughout the cavalry, but only in those portions which were garrisoned in the mountains or on the frontiers. During cantonments and large maneuvers other detachments of cavalry are also armed with the machine gun for experimental purposes.

During the large cavalry maneuvers in 1895 a machine gun detachment was assigned to one corps. It consisted of four Skoda machine guns, model '93, carried on pack horses led by hand. Besides the leaders there were three men to serve each gun. An ammunition horse carrying four cases, containing in all 1,200 rounds of ammunition, followed each gun. No report was made of the use of the gun.

In reports on other maneuvers in Austria the opinion is expressed that machine guns should be transported on pack horses only in mountainous country, and that transportation on wheeled carriages is preferred wherever good means of communication exist, and especially where cavalry can form in large masses It is essential to have the machine gun which is assigned to cavalry brought as rapidly as possible into the firing position, and, after use, to get it promptly started away again. Some have even suggested that machine-gun carriages should be made to hitch to horses either before or behind, so as to obviate the necessity of turning them around before or after firing. The packing and unpacking of the Skoda machine gun from a horse is said to take about one minute.

The "Reichswehr" points out the advisability of making comparative experiments with all the late models. Maxim's type is considered superior to Skoda's, which has only the advantage of being "Austrian" and "cheap."

An experiment was made in which the endurance of the Maxim was put to the test; 7,204 rounds were fired at the rate of 600 shots per minute, and there were only two missfires,

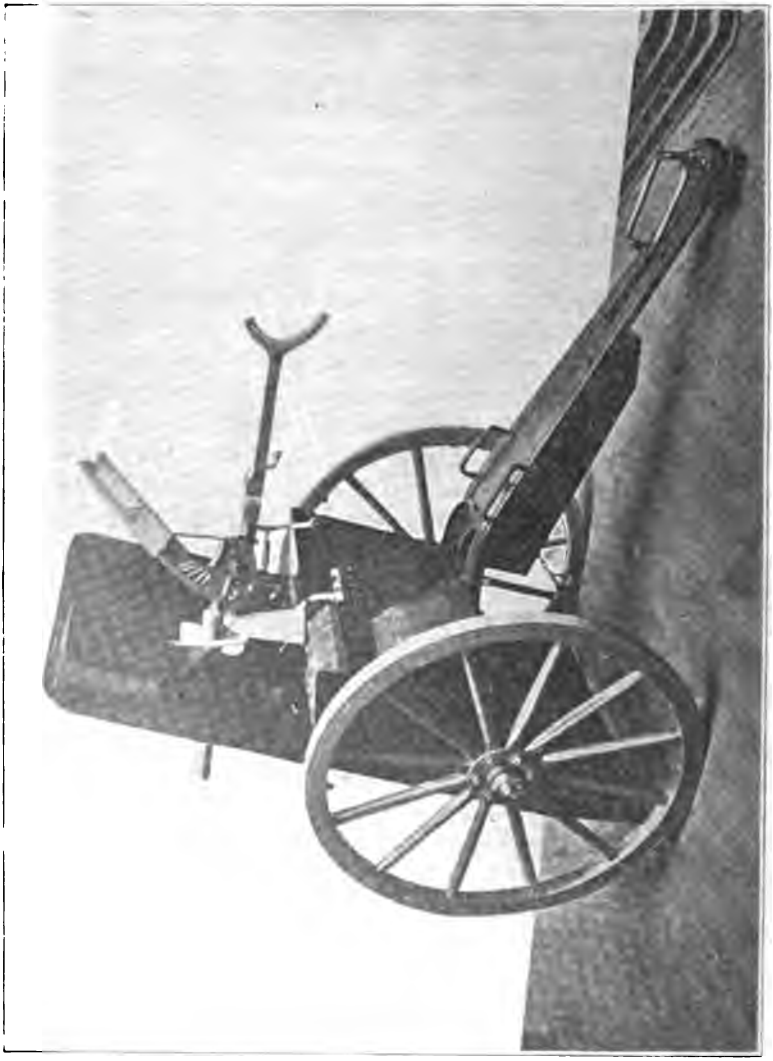


Fig. 6.—Skoda Machine Gun on wheeled carriage, with shield for close action.

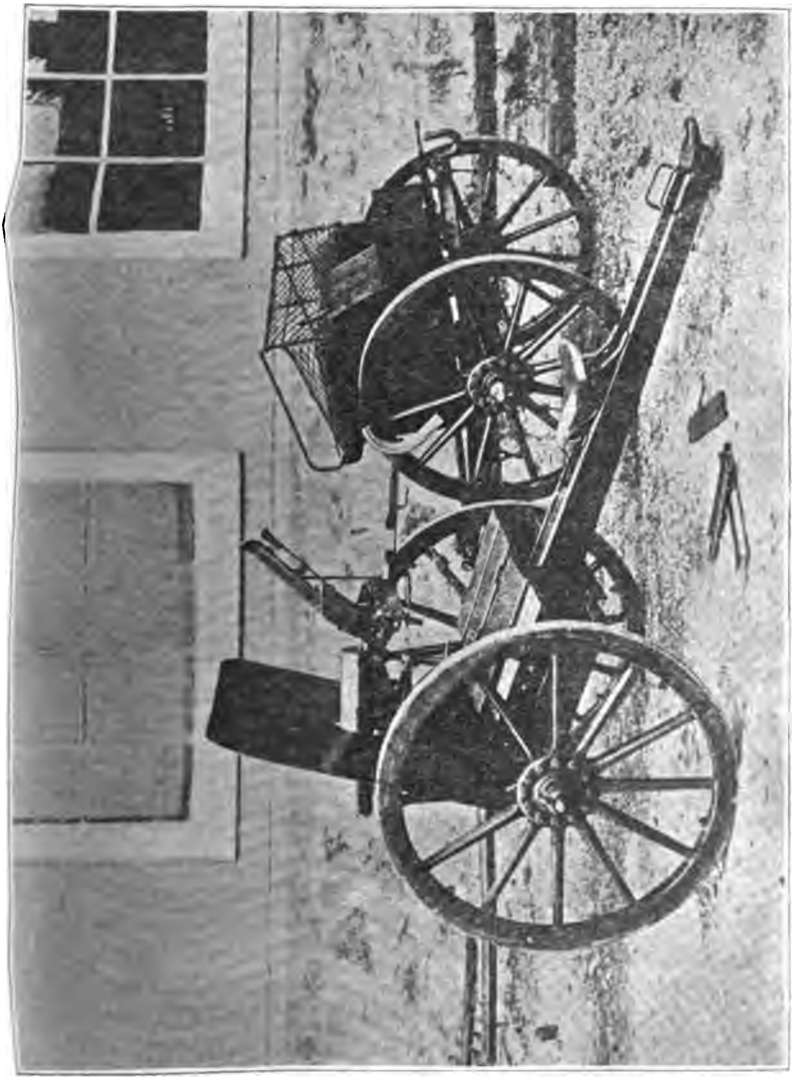


Fig. 7.—Skoda Machine Gun on field carriage, with limber.

due to defective ammunition. When, however, the number of shots had reached 10,000, defects became apparent in the closing mechanism, which had to be renewed. With the aid of the spare parts at hand this was quickly accomplished. The order in which parts had to be replaced was as follows: After 10,223 shots, firing pin; after 11,418, main spring; after 12,038, the breechblock. It is also stated that the barrel itself had to be replaced aftor 6,780 shots.

There is no provision in the Austro-Hungarian drill regulations for the tactical employment of machine guns, possibly due to the fact that no model has been adopted.

BELGIUM.

The Hotchkiss machine gun, model 1899, was accepted in October, 1900, by the Belgian Government, as a result of trials held at the Pyrotechnic School at Antwerp. Eight of the guns were purchased.* This weapon has one barrel, and the bore is the same as that of the Belgian Mauser (caliber .301), whose cartridge it fires. The loading is done automatically by use of belts of 30 cartridges each. A continuous fire of 400 to 450 shots per minute can be executed. When fired in the field the gun is placed on a tripod or on a wheeled carriage. The gun weighs 24 kilograms, the tripod 18 kilograms, and the wheeled carriage 190 kilograms. This machine gun has been tested from a ballistic standpoint at the School of Application and Perfection of Infantry at Beverloo, and at the autumn maneuvers of 1900 it was tested for portability. The experiments at Beverloo were numerous and varied, consisting of calculation of trajectories; deliberate firings at all ranges up to 2,000 meters; continued rapid firings, each series of rounds lasting one minute; comparative firings at infantry and cavalry formation up to 1,200 meters; sweeping fire; determination of the rate of fire; two endurance tests of about 2,000 rounds each; determination of number of rounds that can be fired before wearing out the barrel (the barrel is replaced with great facility), etc., and a thorough examination of the working and endurance of every part of the mechanism. The tests were generally favorable to the gun. The barrel was found to be excellent. The fire was very accurate when the mount (tripod or wheeled carriage) was steady. It was believed that if the tripod and carriage were improved, which appeared an easy matter, the weapon would be very valuable. It was considered that from a ballistic standpoint the model 1899 machine gun and the Belgian infantry Mauser might be considered identical, the loss of gas necessary to actuate the piston which produces automatic action having no perceptible influence on the trajectories. With the rear sight of the Belgian rifle, the deliberate fire was remarkably accurate. Some groups of the shots fired in one minute series of rounds showed good results; others, where the weapon failed to remain steady during the fire, made but few hits on the targets. The Beverloo experiments, like similar ones held in Switzerland, led to the conclusion that four machine guns, as far as effective fire action is concerned, may be equivalent to a company of infantry on a war footing.

---

* According to a Belgian correspondent in the Revue Militaire Suisse, the Government bought these eight guns to arm the battalion in China, but had not finally adopted the weapon, for, though the results attained were good, in general, the mount had shown itself defective.

All the parts of the weapon were reported solid and well adjusted, the breech casing being hollowed out of a single block of steel. Assembling and dismounting presented no difficulties, being done by hand, without the aid of any accessory tools. Fourteen thousand shots were fired with the same barrel before it showed any wear. Comparative experiments gave remarkable results, showing that the fire was equal and even superior to that of select infantry. A case is mentioned of fire at 1,000 meters, in which the defense of a bridge was simulated and 50 per cent of hits were made. The firing tests with blank cartridges did not give good results. Such tests were decided to be useless and to cause more wear on the gun than practice with ball cartridges.

It was believed that the Hotchkiss automatic machine gun would doubtless render great service in all defensive field operations, and in fortresses. Its employment on the offensive, however, it was thought, would be resorted to only in special cases on account of the machine gun requiring especially careful aiming and, on the part of its gunner, an accurate knowledge of range and target—conditions which in general, it was believed, could not be realized except on the defensive.

In the experiments made during the maneuvers to test its portability, two mounts were to have been used, viz, the tripod and the wheeled carriage. The latter, however, was the only one subjected to trial. The tripod mount, however, had already been the subject of experiments in other countries. As to the wheeled carriage, it was tested for the first time in Belgium. Its form did not admit of the transportation of gunners. The method of hitching tandem was found unsatisfactory and it was considered that a pole should be adapted to it. The gun support on the carriage was judged to need modification. The piece itself suffered no perceptible deterioration during the maneuvers.

DENMARK.

According to the Revue Militaire de l'Étranger of 1891, Denmark has a machine gun with two barrels firing the cartridge of the infantry rifle and capable of attaining a fire rate of 400 shots per minute. The gun may be placed on a caponiere mount for the defense of fortified places, or on a field carriage when used by mobile troops. According to the Militaert Tidsskrift of Copenhagen there were delivered to Denmark, from 1893 to 1898, in all thirty-one 37-millimeter and twenty-six 8-millimeter machine guns; of these, thirteen of the 37-millimeter and two of the 8-millimeter pieces were delivered in 1898. Among the older guns used in fortresses to flank trenches, there are a number of Gardner machine guns, which, not being automatic, will probably be gradually discarded.

FRANCE.

The machine gun used in France in 1870 was of the Reffye system. In 1875 this gun was discarded as a fieldpiece, but was still utilized in the defense of fieldworks and fortified places. About ten years ago the French Government began a series of experiments with machine guns. It has finally adopted the Hotchkiss automatic machine gun, model 1899. The service of the gun requires two men, one loading and the other aiming and firing; if necessary, however, one man can attend to the gun. All the material is transported by pack animals, one mule carrying the gun (53 pounds), the tripod (40 pounds), two boxes containing 600 rounds of ammunition (62 pounds), and the spare parts, saddle, etc. (84 pounds). The ammunition is carried by other mules, each being loaded with 1,920 rounds (200 pounds), and the saddle (50 pounds).

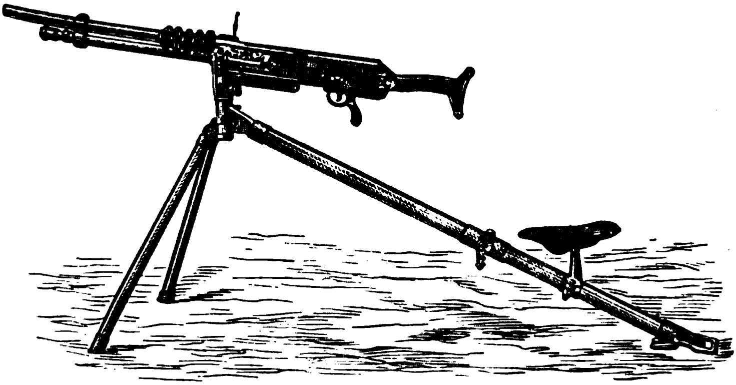


Fig. 8.—Hotchkiss automatic machine gun.

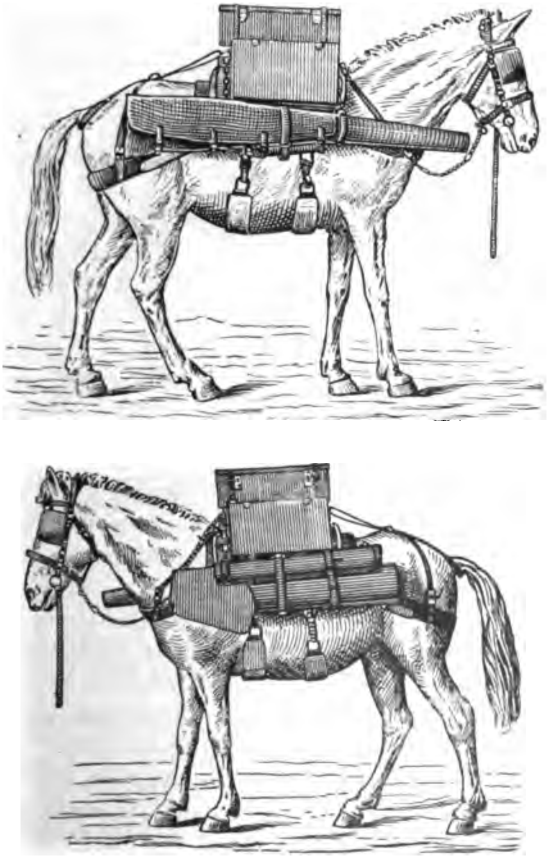


Fig. 9.—Hotchkiss machine-gun pack.

There is also a type of carriage which has a special steel shield, proof against bullets of small caliber. A light steel tube is fixed to the gun, forming a trail and provided with two seats for the gunner and a cannonier. Two thousand four hundred rounds of ammunition are carried in boxes fastened behind the shield. The carriage can be joined to a limber.

The Alpine troops have been provided with machine guns. The project of supplying cavalry divisions with detachments of machine guns is reported to be under way.

From trials recently made near Cherbourg, France, it has been deduced that one machine gun served by two men will develop as much effective fire as 200 rifles. Fifty marksmen were chosen from the colonial infantry to compete with the Hotchkiss 8-millimeter gun which has lately been adopted for the French Alpine troops. The ranges fired at were 400 and 750 meters. At 750 meters' distance the 50 riflemen, firing each 5 rounds independently, obtained 54 hits, or 21.6 per cent of the number of rounds fired. Thirty-two men were then chosen from among the fifty, and these had to fire each 8 rounds in thirty seconds. Under these conditions 34 hits, or 13.3 per cent of the rounds expended, were recorded. The machine gun was then brought into action, and in thirty-eight seconds fired 211 bullets, making 145 hits.

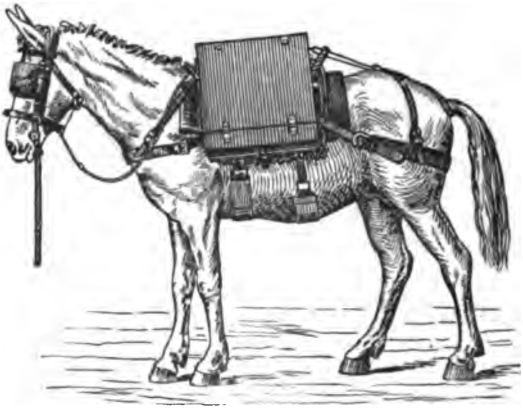


Fig. 10.—Hotchkiss machine-gun ammunition pack.

According to the France Militaire, August 30, 1901, 8 battalions of French Light Infantry (chasseurs à pied) have been given machine guns (Hotchkiss), 2 for each battalion, for experimental purposes.

This arm has the same caliber and uses the same cartridge as the Lebel rifle. It is mounted upon a tripod and requires for its service three men. The gunner, seated upon a saddle connected with the tripod, manipulates the piece, holding it against his shoulder, while the two cannoneers furnish the ammunition. The feed strips contain 24 cartridges each. The greatest rapidity of fire is 400 shots a minute.

GERMANY.

The only one of the German states whose army corps were equipped with machine guns in 1870–71 was Bavaria, and owing to the unsuccessful results obtained with them the whole Empire seems for a long time to have abandoned the idea of using machine guns in field warfare. While the question of machine guns has been the subject of lively discussion in most countries, and while the advocates of these weapons have usually been in the majority, the German military press has been united in condemning their use. Every proposition that has been made in their favor has immediately met with the stoutest opposition, and most writers on cavalry have simply ignored their existence, it being possible to peruse many large volumes devoted to cavalry tactics without finding a line referring even to the possibility that an opponent might be armed with machine guns. Germany has made fewer practical experiments in this line than any other great power.

Among the German colonial troops, on the other hand, machine guns have been put to important use, and as early as 1892 over 100 Maxim machine guns were purchased for East and Southwest Africa.

Of late there have been signs of a change of opinion in Germany in favor of machine guns, which are extensively employed in the navy. In order to awaken interest in their use on land also, the emperor is said to have purchased a sample himself and presented it to one of the regiments of the guard.

The budget for 1901–02 made provision in the military appropriations for the introduction of machine guns in the field army, the law taking effect October 1, 1901. The intention is to equip all the army corps with these guns and for this purpose to form machine-gun detachments (abtheilungen), each of which is to be attached to a chasseur or infantry battalion. For financial reasons the equipment will take place gradually, beginning with five detachments in 1901. These five are assigned as follows: One to the guard corps, one each to the first and seventeenth corps, and two to the fifteenth corps. The following is the composition of a machine-gun detachment: One captain, 2 first or second lieutenants, 1 first sergeant, 2 sergeants, 6 noncommissioned officers (including a farrier and an armorer), 57 privates (including 18 drivers), 1 workman, 16 wheel horses, 18 lead and spare horses, 9 saddle horses; total, 70 officers, noncommissioned officers and men, and 43 horses. The material of each detachment consists of six 8-millimeter Maxim machine guns and two caissons. Infantry and chasseur officers command the detachments.

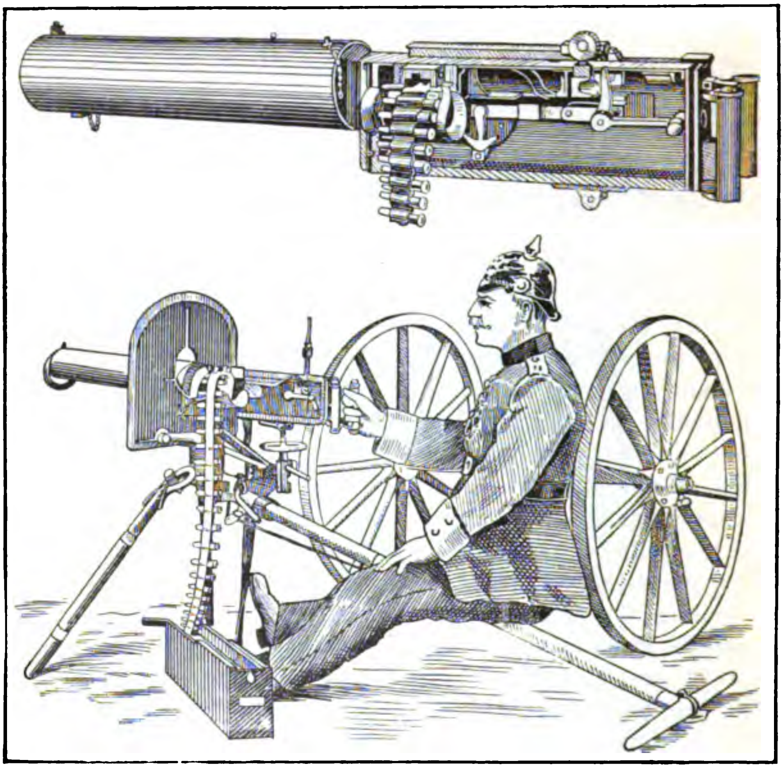


Fig. 11.—Maxim machine gun, German army.

The gunners will have the carbine, noncommissioned officers and drivers the artillery saber, and provisionally the revolver, until the automatic pistol (which is to be the proper weapon) is issued.

Capt. J. M. Home, Second Gurkhas, in the Journal of the United Service Institution of India, October, 1901, criticises the German machine gun formation as follows: "Thus the machine guns are, so to speak, grouped in battery and not attached singly to battalions as is the case in the British army, and our experience would seem to show that we are right and the Germans wrong, as it is hard to see when machine guns can be used en masse, and the splitting up of units in action does not recommend itself."

It was at first attempted to have the machine guns and the caissons drawn by only two horses each, but these were found to be insufficient and now four horses for each vehicle are used.

The following is taken from the Internationale Revue, November, 1901:

"The most important experiments made during this year's imperial maneuvers are those with the machine guns attached both to cavalry divisions and landing troops, the skillful employment of these new weapons exercising the greatest and most decisive influence upon the course of events. The machine-gun detachment of cavalry division A succeeded not only in surprising and disabling the hostile artillery, but also in supporting the attack of its division by taking the hostile cavalry under well-aimed fire and thus bringing about a victorious close of the affair. Similar success was attained by the machine guns of the landing corps in their attack against the right flank of the forty-first division."

The new budget introduced for the year 1902 provides for the addition of seven more of these machine-gun detachments, for the permanent establishment. It is now expected that the budget will in a year or two provide for the permanent organization of one of these detachments for each army corps. Besides the five permanent organizations already in the army, there are some temporary machine-gun detachments (abtheilungen) of 4 guns each, made up by temporary details of men and horses from other organizations, and of guns that were on hand. For further details concerning the German machine-gun detachments see report of Lieut. Col. J. B. Kerr, Ninth Cavalry, United States military attaché at Berlin, upon the German imperial maneuvers for 1901.

GREAT BRITAIN.

England has always shown a great interest in machine guns, owing partly to the extensive use made of them in her colonial wars. In recent years the army at home has also been supplied with them and many experiments have been made with the various new systems. Of these the Maxim has had the lead.

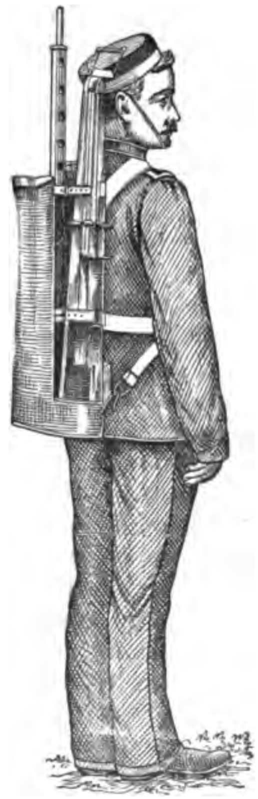


Fig. 12.—One method of carrying Maxim by an infantryman.

Maxim machine guns, 0.303-inch caliber, are used with both infantry and cavalry, as well as with mounted infantry.

In time of war every brigade of infantry (4 battalions) has 2 machine-gun sections assigned to it. Each section is composed of 1 lieutenant, 1 sergeant, 2 corporals, 9 privates, and 6 horses or mules. The material per section consists of 2 Maxim machine guns, 0.303-inch caliber, 1 caisson, and 1 baggage wagon. The ammunition amounts to 21,200 rounds, of which 8,000 are divided between the two gun carriages and 13,200 on the caisson. Each gun is drawn by a horse led by hand. In peace time the sections are assigned to battalions of the brigade, for purposes of instruction.

A section of machine guns is assigned also to every battalion (2 companies) of mounted infantry. The guns of this section are provided with limbers and are each drawn by two horses, one of which is ridden by the driver. The section comprises 1 lieutenant, 1 sergeant, 1 corporal, 8 privates, 6 drivers, 4 riding horses (2 privates mounted accompany each machine gun), and 12 draft horses. The material is composed of 2 Maxim machine guns, 0.303-inch caliber, 2 caissons and 1 baggage wagon. Two gunners ride on each limber. The ammunition consists of 42,200 rounds, of which 7,000 are carried in the two limbers and 35,200 in the two caissons.

To every brigade of cavalry (of 3 regiments) is assigned a machine-gun section of 3 Maxim machine guns, 0.303-inch caliber. A horse battery and 2 companies of mounted infantry form part of the brigade, and to them are joined another machine-gun section with 2 Maxim machine guns, 0.303-inch caliber. The cavalry division, the formation of which is provided for in some cases, comprises 2 brigades of cavalry, each with its machine-gun section; 1 battalion of mounted infantry and its machine-gun section, and 2 horse batteries.

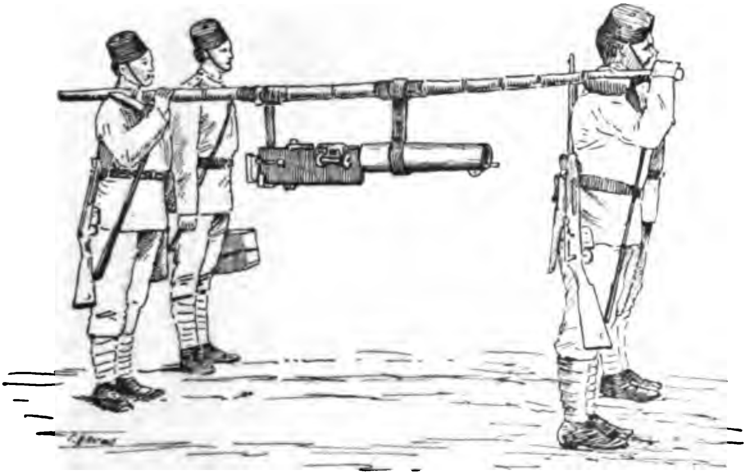


Fig. 14.—Maxim-gun transport used by the 1st battalion, 4th Gurkha rifles, suitable for country or ground impracticable for mules or wheeled carriages.

The following is taken from the British cavalry drill regulations for 1898:

"The action of machine guns will be guided by different general principles from those which apply to the horse-artillery battery. Machine guns take up little space, and when in position present but small obstacles to the movements of the cavalry with which they are acting. Their range, when compared with that of artillery, is limited; but they have this special advantage: they can be traversed when firing, and

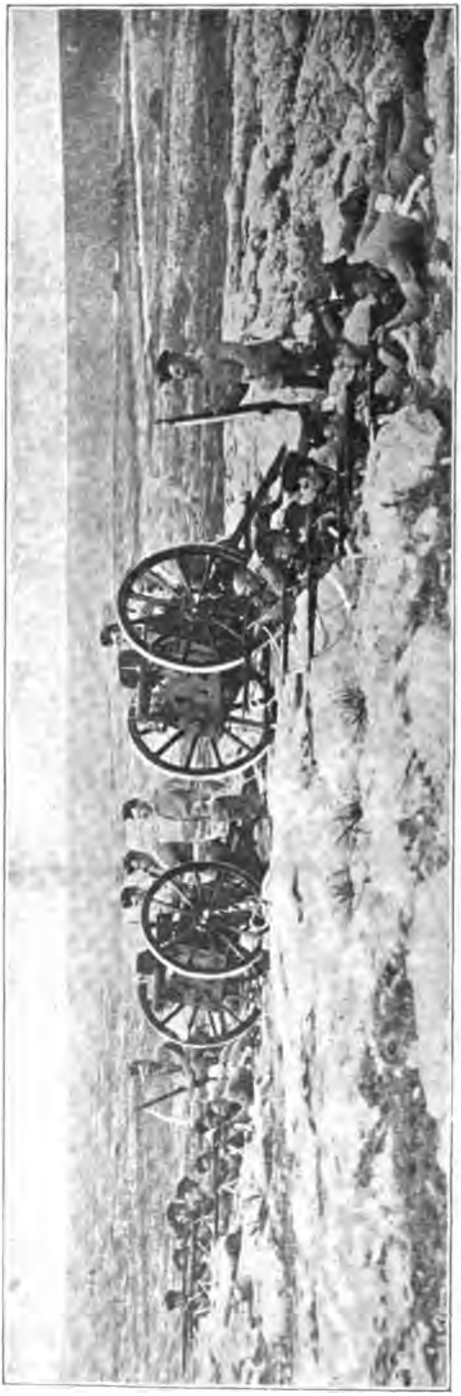


Fig. 13.—Maxims in action.

can thus sweep the whole front of an opposing line with a continuous, rapid, and deadly fire. They should, therefore, take up a position as near as safety will permit to the front or flank of the enemy, from which an effective fire can be maintained; and, in all cases, positions should be chosen for them which the enemy's cavalry could reach only with difficulty.

"Machine guns are to be looked upon as primarily weapons of offense, the employment of which should, if possible, be immediately followed up by the attack of the cavalry. On outposts and other detachment services, however, as well as for the purpose of temporarily holding a position which may have been gained by the cavalry, for the protection of cantonments and bivouacs, and during a retreat their defensive action will frequently be of the greatest assistance to the cavalry.

"It is not generally advisable that machine guns should open fire on individuals, or even on small groups of men, lest their position should be prematurely indicated. As a rule, their fire should be reserved for bodies of not less than a troop.

"The officers in immediate charge of the guns will always be guided by the general instructions received from the officer commanding the division, brigade, or other force to which they are attached; a wide latitude as to movements and the choice of positions must, however, at all times be conceded to them.

"In the fight of the cavalry during the preparation for the attack, machine guns should be pushed rapidly forward to as good a position as possible, and should continue their fire until the squadrons of the first line pass them in the attack.

"Machine guns must act in strict subordination to the movements of the cavalry; and, as their value consists in the assistance which they can give to those movements, they should not, except under peculiar circumstances, have any special escort. Positions should not be taken up by them in which they are likely to be exposed to sudden attack unsheltered by the force to which they are attached.

"When machine guns are thus acting in front of the cavalry, squadron commanders will break off files so as to pass the guns.

"Should the cavalry by its operations take up a position which it is important to hold, the guns must be at once pushed forward to it. Their fire will go far to make up for any want of infantry, and obviate the necessity of dismounting any large portion of cavalry, leaving it free for an immediate advance.

"If the fight of the cavalry has been successful, and the enemy is obliged to give way, the machine guns should at once be pushed forward, and be ready to support the pursuit, or to join in further operations by firing on any forward body which seems prepared to offer resistance.

"Not only in the attack of cavalry, but in cases in which the cavalry is able to threaten the flank of infantry, the material effect of machine guns, and especially the moral impression produced by the unlooked-for opening of their fire, may be expected to bring about situations in the highest degree favorable for the immediate action of the cavalry.

"If machine guns are properly handled in well-selected positions, it should be very difficult for any pursuing cavalry to push home its success without severe loss. Under shelter of their fire, too, time may be gained for the arrival of reserves or for the reconsolidation of broken squadrons.

"They should keep near the rear of the cavalry in its retrograde movement, and seize every opportunity of coming into action.

"In a retreat through a defile, or through country intersected with few passages, machine guns can render the most essential service. In an intersected country, all obstacles to the enemy's advance will give opportunities for their effective action. In a retreat past or through a village, or by a bridge, mountain pass, or other defile, the circumstances of the moment must decide whether the machine guns should pass first, with a view to coming into action beyond, or should remain in action as long as possible at the entrance of the defile, etc., only following the brigade when the latter has cleared the passage. A machine gun, with its light equipment, can always fall back so rapidly that it will generally be better to leave it in action as long as possible at the entrance to a defile, until its preservation makes retreat an absolute necessity.

"When seizing a position, detached forces of cavalry pushed forward should be accompanied by machine guns and mounted infantry. If the position is already occupied by an enemy who has to be driven from it, the fire of machine guns and mounted infantry will materially supplement the carbine fire of the dismounted men. If the position is unoccupied, and has only to be secured with a view to defense, the machine guns will be so placed as to command the probable line of advance of an enemy's force. In both cases a great increase to the power of the cavalry is placed in the hands of the cavalry commander. The accuracy and volume of machine-gun fire will largely save the employment of dismounted cavalry for both attack and defense, and the cavalry commander can thus keep all his men mounted, ready, when the favorable moment comes, either to attack or deliver a counter blow on a threatening enemy."

According to the United Service Gazette, a new machine gun, the "Simpson machine rifle," has been officially accepted after a series of thorough experiments and each infantry battalion will soon receive 50 of these machine guns.

The Simpson machine rifle is a small Maxim and can be operated as easily as a rifle by one soldier. It fires a great number of bullets with considerable velocity.

ITALY.

The machine gun used in Italy is the Gardner gun, according to an annual official publication showing the ordnance material adopted by Italy each year. In the issue for 1892 is given a plate and description of the model 1886 10.35-millimeter two-barreled machine gun adopted that year. It is a Gardner gun mounted on a tripod. No reference is made in the subsequent editions of the same annual to any other type of machine gun having been adopted.

In a catalogue of the Gardner Gun Company of 1895 the statement is made that very successful trials were made with the Gardner machine gun by the Italian ordnance board in 1883, and that as a result the Italian Government ordered 250 guns, and that since then the Italian Government has acquired the right to manufacture them and had made 200, making in all 450 of these weapons in the Italian service (in 1895).

The following is the composition of a battery of the model 1886 two-barreled 10.35-millimeter machine guns in Italy, according to an official publication dated 1892:

	Officers.	Enlisted men.	Horses.			Pack animals.	2-wheeled wagons.	Matériel to be packed.
			Officers'.	Troop.				
				Saddle.	Draft.			
Commander (subaltern officer)	1		2					
Quartermaster or quartermaster sergeant		1		1				
Sergeant		1		1				
Corporal major or accountant corporal		1						
Corporals		3						
Lance corporals		3						
Farrier		1						
Saddler		1						
Trumpeter		1						
Officers' servant		1						
Privates		34						
Machine guns with mounts and accessories								6
Mules to carry machine guns						6		
Mules to carry machine-gun mounts						6		
Mules to carry ammunition chests						12		
Wagons*					22		11	
Draft horses (reserve)					2			
Pack horses (reserve)						4		
Total	1	47	2	2	24	28	11	6

*Of the 11 wagons, 8 carry ammunition, 1 transports forage, 1 baggage, and 1 is used for various services.

JAPAN.

Two machine-gun batteries, each numbering 6 guns, 3 officers, and 52 men, have been attached to the first and second infantry divisions. The machine guns of one battery are Gatlings, and those of the other are Maxims. After experiments one of these types is to be adopted. The order with regard to the service of the machine guns states that they are under the immediate orders of the division commanders who may assign them in sections of two guns each to infantry brigades and cavalry regiments. They are recommended to be used with advance guards; with cavalry, to hold positions till the arrival of the infantry; and, in case of retreat, with rear guards.

Fifty Maxim machine guns, caliber 8 millimeters, mounted on light carts, each to be drawn by one man, are attached to the infantry of the guard.

MEXICO.

Mexico has machine guns of the Colt and Maxim systems. There is one machine-gun company, composed of 3 captains (first and second), 3 first lieutenants, 3 second lieutenants, 1 first sergeant and 12 sergeants, 24 corporals, 3 musicians, 72 privates, 1 farrier (sergeant), 1 workman (mancebo), 1 saddler (sergeant), 1 armorer, and 50 mules. Of the 72 privates, 6 are for duty as orderlies. This company is to serve to equip the infantry with the necessary number of machine guns in certain special services. The company serves 24 machine guns and is divided into 12 sections. The squads of one piece each are each composed of a corporal and 2 privates. Each section is commanded by a sergeant and each platoon of 2 sections by an officer. The machine-gun company on a war footing will have its strength doubled and the number of mules increased to 142, in order that 48 machine guns may be served.

NORWAY.

In 1896 a committee was appointed to test machine guns. The Maxim gun was given special attention. It had been alleged that the mechanism of this gun requires special skill on the part of the operator, and that an armorer's assistance is occasionally necessary, although all the more complicated parts are gathered together in a removable breech mechanism, which can be quickly replaced by a new one. During the firing and the severe tests to which the mechanism was subjected with water, sand, wet and frozen feed belt, etc., the mechanism worked perfectly. Seven thousand five hundred shots were fired with a single weapon, whereupon it was used in practical experiments by troops. In all, 10,000 shots were fired, during which the two barrels accompanying the gun were alternately used.

In its report the committee states that the Maxim machine gun may be considered an excellent weapon with regard to efficacy of fire, regulation of the rate of fire, accuracy, and in the elevating and traversing arrangement; also that it is very easy to operate and requires a minimum of personnel to serve it, and that although the mechanism is complicated, it works satisfactorily and reliably, being solid and not sensitive to dirt and moisture.

While making these experiments the committee received a request from the Hotchkiss and Nordenfelt firms to make a comparative test with their guns also. A new committee was appointed for this purpose, with instructions to make a final recommendation for the purchase of machine guns. This committee, in its final report, states that the Maxim and Hotchkiss models are alike as far as the qualities mentioned above for the Maxim are concerned, but that the Hotchkiss has the following advantages, namely, that the mechanism is more solid and less complicated, the causes of hitches in the action of the mechanism are easier to detect and remedy, and that no water jacket is required to cool the gun; moreover, its weight is considerably less, it stands steadier during fire, and is cheaper. The committee considered the Hotchkiss machine gune adequate to all reasonable demands that for the time being could be made of a weapon of this kind, and recommended the purchase of guns of this type, both for use in fortresses and in the field army. The Storthing appropriated 250,000 crowns for the purchase of machine guns and ammunition, with the provision that the cavalry should first be equipped with 4 guns per corps, the guns to be distributed among the squadrons and carried on pack horses. The choice of this mode of transportation, which was made in view of the difficulties of the terrain, does not seem to have met with general approval, several officers having published their opinions that a wheeled carriage is far preferable, claiming that pack transportation would meet with many difficulties in the way of ammunition supply, and that it would require a much larger personnel and more material. The composition of a machine-gun detachment is as follows: One officer, 4 sergeants, 16 corporals and privates, 34 horses, 1 wagon.

RUSSIA.

The United States military attaché in Russia, August, 1897, reported on Russian machine guns as follows: "The 7.6-millimeter gun—probably Maxim—has been tried with the cavalry, and it is now intended to add two to each horse battery of 6 guns. Each brigade of cavalry has a horse battery. One hundred 7.6-millimeter machine guns were purchased for fortresses and the same kind will be manufactured at Tula."

By order of March 23, 1901, there was ordered, upon the proposition of the general artillery directorship, the formation of 5 machine-gun companies for experimental purposes.

These companies are being formed with a provisional organization in the fourth, sixth, eighth, and sixteenth infantry divisions in Europe, and in the third chasseur (rifle) brigade in East Siberia. With the exception of the latter, which receives a war establishment, these companies are all organized on a peace footing.

For the instruction and training of the enlisted personnel of these units officers of the artillery arm have been assigned.

This provisional organization can be seen from the following table:

	War footing.	Peace footing.	Remarks.
Officers	5	4	
Noncommissioned officers	11	10	
Men	87	65	
Horses	36	20	
Maxim machine guns	8	8	
Mountain limbers	8	8	Each limber holds 1,350 rounds; each caisson 4,500 in feed belts.
Two-wheeled caissons	8	8	
Train wagons	6	----------	

The machine-gun companies of the sixth and sixteenth divisions are each under the orders of the chief of the general staff of the division; those of the fourth and eighth divisions are attached to the fourteenth and thirtieth infantry regiments.

SWEDEN.

In September, 1899, experiments were made at Vaxholm and Oskar-Frederiksborg with several models of machine guns. Among the systems tested were the 8-millimeter Nordenfelt and the 6.5 and 8 millimeter Maxim machine guns. The tests were made with regard to accuracy and efficacy of fire, sensitiveness to moisture and dust, endurance, and smooth working of the mechanism. The result was not satisfactory with regard to any of the systems tested. Attention was then drawn toward the Hotchkiss machine guns, which had been tested with good results in France and Belgium, and in the spring of 1900 more experiments were begun. Many defects were then found which were afterwards corrected by the manufacturers, and in August and September, 1900, more experiments took place at the same locality. Feed belts of 30, 50, and 250 cartridges were used. The following was the result reported:

"In comparison with the other models tested the Hotchkiss may be given the preference as far as concerns adaptability to use on armored carriages and in mobile defense, for the following reasons: The gun consists of a few simple and solid parts; the action of the mechanism is easily understood; the parts which are liable to injury during fire are replaced with facility; causes of improper working of the mechanism are readily detected; no water is needed for cooling the barrel—an advantage, because of the production of steam which is likely to disclose the position of the gun; the water is besides often difficult to procure and transport; of all the models tested the Hotchkiss is the least affected by dampness or dust; burst cartridges do not disturb the operation of the mechanism, as is the case with the Maxim.

"Among the 20,000 rounds fired with the Hotchkiss there was no instance of a shell bursting during fire. This frequently occurred with the Maxim and caused pauses in the firing. All the defects formerly found had been remedied, so that no trouble occurred in the working of the mechanism during the last trial. The committee is therefore of the opinion that the 6.5-millimeter Hotchkiss machine gun in its present form (Swedish model) fulfills all just demands which can be made of such a weapon."

SWITZERLAND.

The Swiss Federal Assembly ordered the creation of four mounted machine-gun companies by decree of June 28, 1898. In a decree of April 6, 1900, the regulations on the organization, instruction and equipment of the companies were promulgated.

The gun is the Maxim machine gun. When in use, it rests on a collapsible iron tripod, with a seat similar to a bicycle saddle placed on the rear leg of the tripod.

The four newly formed machine-gun companies—one attached to each army corps—are each placed under the orders of the commander of the cavalry brigade of the corps. The establishment of each is fixed as follows: One captain, 1 first lieutenant, 2 second lieutenants, 1 first sergeant, 1 quartermaster, 4 sergeants (2 being armorers), 10 corporals (2 being armorers), 1 trumpeter and 1 saddler, 2 farriers, and 40 privates; besides 1 noncommissioned officer and 7 soldiers of the train; 6 officers' horses and 61 men's horses, 16 pack horses, and 14 draft horses, 8 machine guns, 4 two-horse caissons, 1 provision and baggage wagon, and 1 4-horse field forge with kitchen attached. The total strength of a company is

4 officers, 68 noncommissioned officers and men, 97 horses, 8 guns, and 6 wagons. With regard to recruitment, equipment, pay, remount, and service obligations, the officers and enlisted men are placed on the same footing as the cavalry. Special instruction as machine-gun firers is given them in special detachments attached to the recruit schools and repetition courses of the cavalry. The train personnel and draft horses are furnished from the artillery. The pack horses are partly taken from the supernumerary horses of the cavalry remount depots and partly hired. The train soldiers of the machine gun companies receive their training in the artillery before entering said companies. The training of the machine-gun troops is done partly according to special regulations for these troops and partly according to cavalry regulations. The recruit school lasts ninety days. Men who enlist as armorers follow, after the recruit school, a three-week course at the federal arms factory in order to perfect their technical knowledge. The machine-gun companies hold a fourteen-day repetition course every year.

Privates of the companies who are recommended for appointments as corporals are trained to be noncommissioned officers in the cavalry cadet schools, the regulations for the cavalry serving as a basis for this training. Officers may be either taken from these troops or transferred from the cavalry, but they always receive their first training as officers (after leaving the recruit school) in the officers' training school for cavalry. At their request or even without it the officers may at any time be transferred back to the cavalry. Every officer appointed or detailed to a machine-gun company must immediately attend the whole course of a machine-gun recruit school or else sixty days at a cavalry recruit school and thirty-five days with machine-gun troops. On the other hand, officers who are transferred from the cavalry to one of the four companies must attend a machine-gun recruit school for thirty-five days, and vice versa, those who are transferred from a machine-gun company to the cavalry must go through a thirty-five-day recruit school of the latter arm. First lieutenants who are recommended as commanders of machine-gun companies must, after successfully passing through a cavalry-officers' school, attend a cavalry and machine-gun recruit school to test their abilities further. Commanders of machine-gun companies who are recommended as field officers must, before being appointed, have commanded satisfactorily a squadron of cavalry for at least two months. First and second lieutenants of machine-gun companies not only take part in the tactical schools of the cavalry, but they are also detailed to the firing school at Wallenstadt. In regard to equipment, armament, etc., of the officers, noncommissioned officers, men, and horses of the machine-gun companies, the same regulations are in force as for the cavalry. Each company carries with it, beside the heavy trenching material, 12 picks and 12 leather sacks with tools and spare material, also 12 field glasses for sergeants, chief gunners, etc. The company forms a tactical and administrative unit the same as a squadron of cavalry. Usually, and especially during maneuvers and in war, the company is under the direct orders of the commander of the cavalry brigade. In maneuvers and in battle the company commander will generally be with the supreme commander, the first lieutenants then commanding the companies. The companies are each divided into two platoons of 4 guns each, each platoon being commanded by a second lieutenant. Each platoon is divided into two sections of 2 guns each, and each of these sections is commanded by a sergeant. A sergeant takes charge of the horses of the dismounted men, while the train noncommissioned officer takes charge of the wagons. Eight of the corporals are gunners and 2 have charge of the ammunition supply. Of the privates, 5 are assigned to each gun as follows: No. 1 is assistant of the corporal who lays, aims, and fires; No. 2 is an ammunition bearer; No. 3 is a reserve man; Nos. 4 and 5 hold horses. Sergeants and the quartermaster are responsible for placing the horses and wagons in as protected a position as possible.

In the Swiss mounted machine-gun companies the gun and mount are transported on a pack horse. A frame is strapped to the saddle girth of the horse, on the off side, and the gun is fastened to this, muzzle to the rear. The tripod is fastened in a similar manner on the near side of the horse. Both gun and tripod are covered with leather cases to protect them from the weather and from jolting. The gun weighs about 62 pounds and the tripod about 48 pounds, the water vessel being fastened on the same side with the latter as a counterbalance in weight. On one gun-horse of each section are packed, as a counterbalance, the reserve parts and tool sack. The ammunition horse carries the ammunition packed in a small chest containing four filled feed belts with 250 cartridges each, and also its own ration of oats and that of the gun horse. With their full pack, saddle, and bridle, the horses carry between 238 and 264 pounds each. Twenty thousand rounds of ammunition are carried on the ammunition horses and 60,000 in the caissons, which are drawn by two horses driven from the saddle. On the caissons are carried also tools, lanterns, implement chests, spare horseshoes, and two days' rations for all the horses. The formations chosen for the companies for battle are most simple, permitting the quickest deployment and preparation for fire. The march formation is generally in column of threes as follows: First—sergeant, chief gunner, and assistant gunner; second—reserve man, gun horse and its leader; third—ammunition bearer, ammunition horse, and leader; then follows the second gun, and in immediate succession follow the others. In rear of the platoon or of the company follow the caissons.

It has not been definitely decided yet whether the men will carry the revolver, automatic pistol, or carbine; provisionally they are carrying the two former, but will probably retain only the pistol. The companies are to be strengthened in men and horses to the number of 105 each, in order that the company may be formed into two gun platoons and one platoon of troopers.

The principal object of the companies is to accompany the cavalry in any kind of country, in order to take the place of artillery, which might not be able to follow. Machine guns attached to cavalry are much more useful than infantry following in wagons. The fire of machine guns is regarded by the Swiss as much more sudden, stronger, and more effective than that of infantry, owing to the strong concentric sheath of the machine-gun fire. Machine guns are also regarded as much more mobile than artillery, and adapted to use on any kind of terrain. Cavalry with machine-gun units attached has the advantage, both in defensive and offensive operations, of having to dismount fewer men to fight on foot, and may, therefore, hold all its sabers ready to make a mounted attack more quickly at a given moment. The rule is never to detach and put into action fewer than two guns. They proceed ahead with the advance guard, occupy and hold positions until the arrival of the main body, and on the defensive they place under their fire the routes over which the enemy is

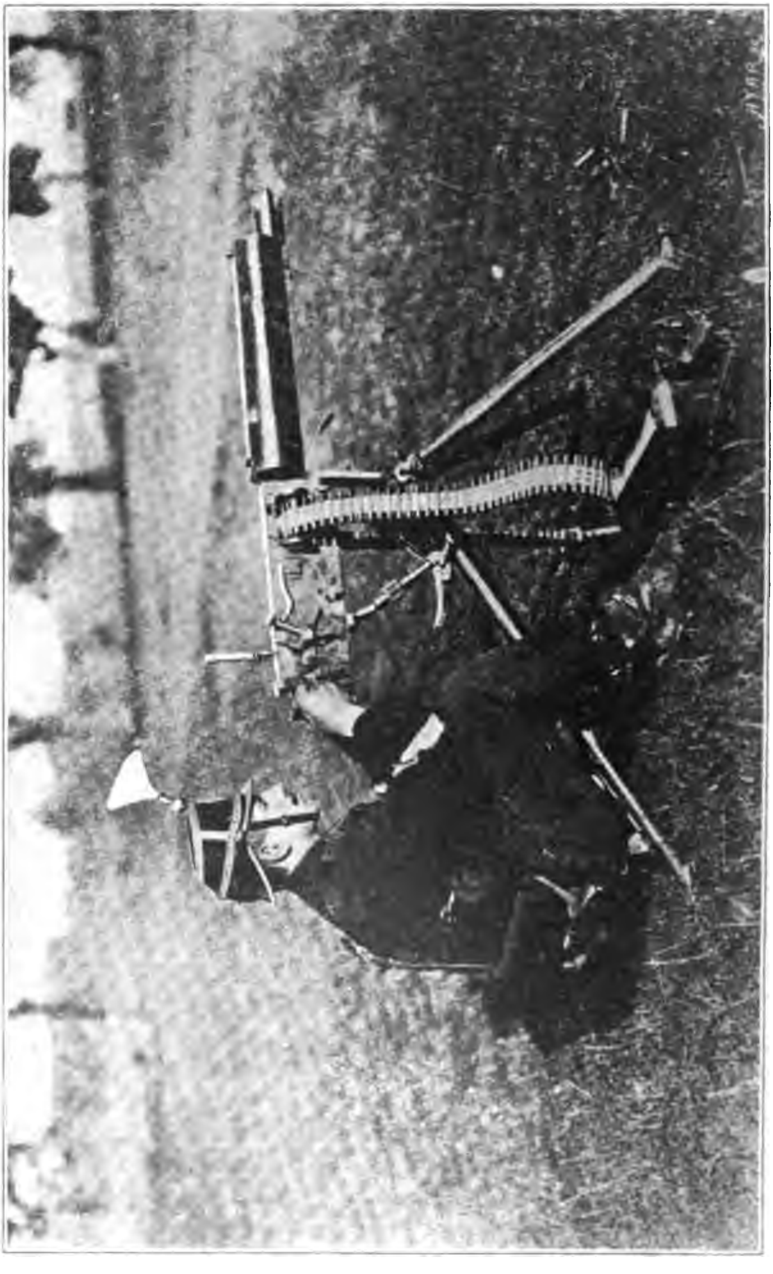


Fig. 15.—Swiss Maxim.

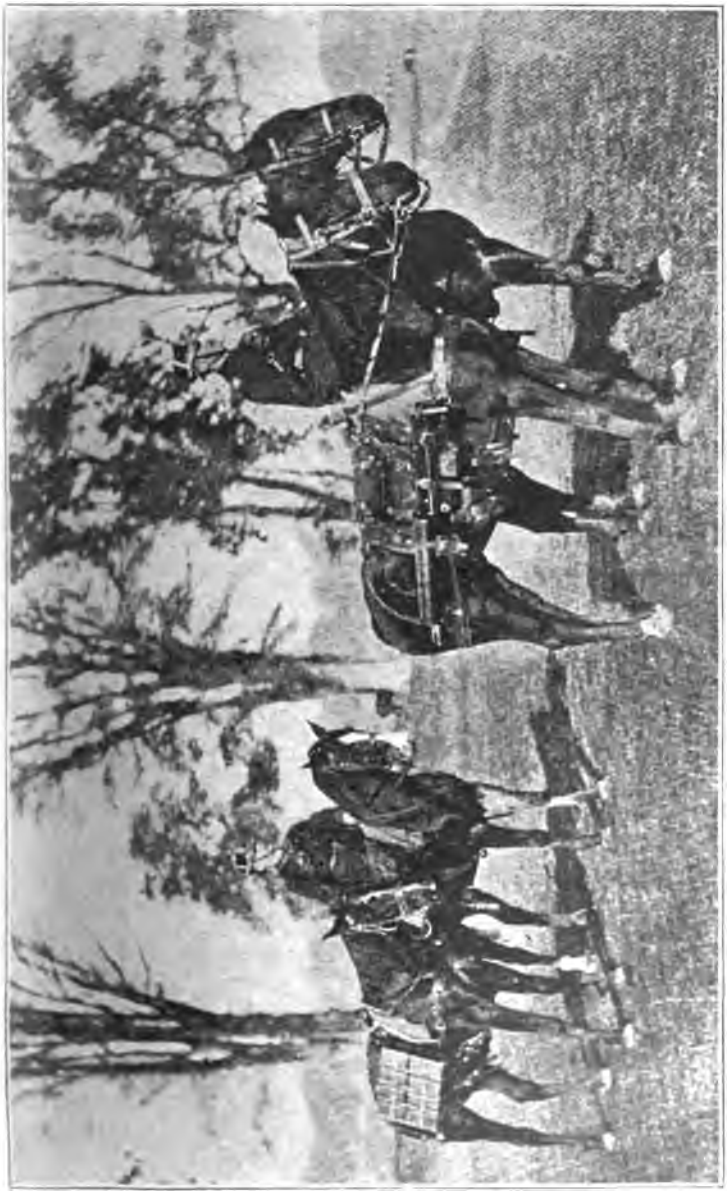


Fig. 16.—Transportation of the Maxims. Swiss mounted machine-gun companies.

approaching, as well as the points that are favorable to his action. In retreats they hold in check an enemy who is pressing too hard. Machine guns, properly used, are believed to be often of decisive significance in the various phases of a battle, especially in difficult and rough country.

UNITED STATES OF AMERICA.

Many types of machine guns have been tested, a number of types issued, but none adopted.

For complete descriptions and tests of the Colt automatic machine gun, caliber .30, model 1899, the Hotchkiss automatic machine gun, caliber .30, and the Maxim solid-action gun, caliber .30, and the Vickers R. C. automatic machine gun, see report of the War Department 1900, Report of the Chief of Ordnance.

For complete descriptions of the Gatling gun, caliber .30, model 1895, and the Maxim-Nordenfelt automatic machine gun, .303 caliber, see Report of the Chief of Ordnance, 1896.

For complete descriptions of the Maxim gun, Gardner gun, and the Hotchkiss revolving cannon, see Bruff's Ordnance and Gunnery.

VARIOUS.

Brazil, Chile, and Ecuador are experimenting with machine guns.

en made

s of vari-
e sake of
e carbine
en coun-
he Krag-
e follow-
erest:

eriments
made.—

Canada

nducted
or some
'.

as been
lon. It
nd that
as soon
s which

rtridges
hrough
ng data
ich is of

T

Sword ba

Knife --

Knife --

Sword --

Knife --

Knife --

Knife --

Knife --

Knife --

Sword ba
tern 1
bayon

------ --

Sword --

Sword --

Sword --

Ordinary
lar.

Knife --

Sword (
baione

Knife --

Knife --

Sword --

Knife --

'Old type
gular
tion).

Knife --

Knife --

Sword --

---- -

V.—SMALL-CALIBER RIFLES.

No radical change in small-caliber rifles has been made during the year.

The table accompanying gives the data of the rifles of various countries as far as obtainable to date. For the sake of brevity the rifle only is given. In most countries the carbine is of the same make and model as the rifle. Eighteen countries use the Mauser rifle, five the Mannlicher, three the Krag-Jörgensen and the remainder use various types. The following notes on the subject of rifles are quoted as of interest:

AUSTRIA-HUNGARY.

The Militär-Wochenblatt, Berlin, states that experiments with rifles of 6, 5.5, and 5 millimeter caliber are being made.—*United Service Gazette, London, June 8, 1901.*

CANADA.

According to Arms and Explosives (January, 1902), Canada has adopted the Ross straight-pull magazine rifle.

FRANCE.

The Militär-Wochenblatt states that very secretly conducted experiments with a new rifle have been carried on for some time.—*United Service Gazette, London, June 8, 1901.*

THE NEW LAMACCHIA RIFLE.

The rifle invented by the watchmaker Lamacchia has been experimented with in the polygon of Mourillon at Toulon. It seems that the results obtained are very satisfactory and that further experiments will be made with the new rifle as soon as the inventor will have made a few modifications which were suggested to him.

It is an automatic repeating rifle, containing 16 cartridges disposed in the stock, into which they are introduced through four apertures made underneath the stock. The firing data of this rifle correspond to those of the Lebel rifle, which is of the same caliber (8-millimeter). It weighs, however, only 3 kilograms, while the weight of the Lebel rifle is 4.8 kilograms. The 16 cartridges of the magazine may be fired consecutively without taking the rifle from the shoulder.—*Rivista di Artigleria e Genio, October, 1901.*

GERMANY.

New Rifle.—The new military rifle, with which the German army is to be equipped as speedily as possible, is said to be the last word in modern science. It is sighted up to 2,050 meters, or about 2,250 yards. The rifle itself is only 4 feet 1 inch long, but it is fitted with a 26-inch bayonet, giving a total length of 5 feet 10 inches, which is an 8-inch longer reach than that of the British service arm. The weight of the rifle is just over 9 pounds, and of rifle and bayonet together, 9 pounds 15½ ounces, which constitute it a lighter weapon than the Lee-Enfield.—*Arms and Explosives, February, 1901.*

AUTOMATIC RIFLES FOR GERMANY.

The German military authorities do not appear to regard the improved magazine rifle as representing finality, for we learn that they are now subjecting various types of automatic rifles to a series of exhaustive tests at Spandau. For the present, while several kinds are being experimented with, no definite decision has been made, so that the rearming of the troops with the new Mauser will continue pending further developments.—*Arms and Explosives, September, 1901.*

GREAT BRITAIN.

NEW MODEL OF LEE-METFORD RIFLE.

A new model of the Lee-Metford rifle has been adopted. It is more quickly loaded and is less sensitive to exterior influence than the former model, which is inferior to the Mauser rifle used by the Boers. It is said about the former Lee-Metford bullet that its stopping effect was too small. This defect has been removed and a new bullet, the so-called "man-stopper," devised. In the Enfield factories 4,000 men are employed day and night at the manufacturing of the new rifle. The rearmament of the English infantry will consequently shortly take place.—*Armeeblatt, April 10, 1901.*

According to the Broad Arrow the armament of the whole infantry with the Lee-Enfield rifle is now complete, with the exception of eight regiments.—*Internationale Revue, October, 1901.*

IMPROVEMENT OF THE LEE-METFORD RIFLE.

An improved Lee-Metford rifle was tested in the presence of Artillery Colonel Bingham on Runnymede proving ground in November, 1901. The improvement has been devised by a Mr. Hylard, of Melbourne. The new rifle is called the Hylard magazine rifle. The new breech closure is simpler and safer when the rifle is carried loaded; it is also easily removed. The improved rifle consists of 24 pieces, which may be easily and quickly dismounted. During the test a well-known marksman, Mr. Fulton, was firing with the Hylard rifle while a sergeant was using the unaltered Lee-Metford. Each fired off 20 cartridges. According to information received through British channels the firing lasted one minute and forty-five seconds for the Hylard, and two minutes and five and seven-tenths seconds for the Lee-Metford rifle. Mr. Hylard is likewise the inventor of a cartridge belt which is slung over the shoulder and into which it is far easier to introduce cartridges. It was proved by tests, during which each man received 50 cartridges, that the Hylard belt could be filled one minute more quickly than the ordinary cartridge belt. After each firer had received orders to fire off 20 cartridges taken out of their belts the duration of fire of the Hylard rifle was one minute and fifteen seconds while that of the Lee-Metford was three minutes and ten seconds.—*Armeeblatt, December 11, 1901.*

CARBINES FOR INFANTRY OFFICERS.

At the beginning of the war with the Transvaal losses among officers were very great. Each time the Boers noticed a man without a rifle they immediately aimed at him, for they understood him to be an officer. With the purpose of diminishing casualties among officers, General Roberts issued an order that the officers should enter into action armed with rifles, leaving aside the sword. It seems that this measure will henceforth be applied to the whole army. The Times of July 22, says:

"It was announced officially that as the infantry officers who are not mounted will henceforth be armed with the carbine for the action and maneuvers, instruction in the manual of the sword will be abolished except in drawing, returning, and saluting.

"Infantry officers who are not mounted will not carry the sword either in field service or on review."—*Revista del Circulo Militar, October, 1901.*

THE ROSS STRAIGHT-PULL MAGAZINE RIFLE.

We were recently enabled, through the courtesy of its inventor, Sir Charles Ross, to witness a private demonstration of the working of the Ross straight-pull magazine rifle, which is designed as a military weapon primarily, though its capacity for adaptation to the needs of the sportsman follows as a matter of course.

Sir Charles Ross has been wisely inspired in producing as his sample British weapon one which is adapted for the existing .303 service ammunition, since this at once places it within the region of practical politics as a military arm that is well worth the careful consideration of the small-arms committee, and allows of a ready comparison with the Lee-Enfield on all counts. But beyond the leading conditions of having a barrel of service caliber chambered to suit the government cartridge, this rifle has few points of similarity with that now issued to the British army. Even in external appearance the differences are sufficiently striking. For example, the magazine of the Ross rifle is flush with the wood of the stock, so that there is no unsightly metal projection in front of the trigger guard to worry the soldier in every conceivable way, and to prevent him from "sloping arms" according to the time-honored custom prevailing before 1892. It is well known that the method of carrying the Lee-Enfield sideways at the "slope," which is necessitated by the obtrusion of the magazine at the place which should naturally rest on the shoulder, proves excessively tiring to the wrist and hand during a long march, and tends to cause a marked unsteadiness if any firing has to be done subsequently. Another feature to be noted is the continuation of the woodwork in one unbroken piece from butt plate to muzzle locking ring, in place of the ugly and unpractical dividing of the stock just behind the shoe in the Lee-Metford and Lee-Enfield rifles, which was adopted, apparently, for no other reason than because the Martini-Henry had, perforce, to be so divided. These are features which are at once appreciated by a practical observer, but as regards other external characteristics it may be said that the rifle which Sir Charles Ross has brought from Canada is what is termed a "shop pattern," and may be capable of some modification, as, for instance, in the matter of providing a half pistol grip to the stock. On the other hand, this weapon in its present form "handles" beautifully in every respect, and the woodwork is finely modeled without sacrificing any of the strength requisite in an arm destined to the unceremonious treatment of a "Tommy" under service conditions.

Turning to the mechanism of the rifle, the bolt is of the front-lock straight-pull variety, a single rectilinear movement backward and forward serving to lock and unlock the breech action and cock the firing pin. This simplicity of operation, which is very marked in firing the rifle as compared with the usual turning bolt, is attained by making the bolthead separate from the main portion of the bolt, the two engaging by a series of volute grooves in such a manner that the pushing of the bolt home rotates the head, so that two lugs upon it enter into corresponding recesses in the front end of the breech shoe as in the turning-bolt system, and vice versa, the withdrawal of the bolt rotates the head so as to free the lugs. It should be noted in this connection that Sir Charles Ross has fitted a long and strong mechanical extractor, which, in conjunction with the easy action of the bolt movement, suffices to dislodge even the most obdurate cartridge case. The extractor is in reality a long piece of steel, spring-tempered so as to allow it to snap over the rim of the cartridge, but for extraction it does not rely on its strength and springiness. On the contrary, the undercut lug laps over the extractor during the withdrawal of the bolt, thereby locking it mechanically against the cartridge case. That the inventor combines the practical knowledge of the soldier with the mechanical ingenuity of a born inventor, is shown in his arrangement of the sear and trigger. He has so designed these that, though a strong trigger spring is provided, the rifle would be quite as effective were the spring broken or lost. The sear piece consists of two parts, the one being of the usual bell-crank form working on a rocking pin, with one end engaging in the trigger and the other in the usual manner in a detent in the cocking piece for the purpose of holding back the striker in the cocked position. But, in addition, there is another arm on the rocking pin, reaching forward and normally in contact with the underside of the bolt; it is compelled, except under the stress of great force, to act on the sear proper by the pressure of a very powerful spring, so that even were the trigger blade entirely disconnected, the sear would be compelled to engage with its corresponding detent in the cocking piece as the bolt was shot forward into locking position. So far, so good; but we may imagine that both the trigger spring and this special sear spring become inoperative through breakage or any other cause. In this case the trigger guard is slotted, and the trigger is made of extra depth so that it projects backward an appreciable distance through this slot. In the natural process of handling the rifle and operating the breech mechanism, the middle finger of the right hand presses against the back of the trigger guard just at the very spot where there is this projection of the trigger, and that pressure of the finger operating through the trigger to the sear affords at once the missing impulse to engage the sear with the cocking piece.

The next point of interest lies in the magazine, which, as has already been pointed out, is of a compact form, kept flush with the woodwork of the rifle. Generically, the Ross magazine belongs to the same class as the Harris magazine, to the extent that it consists practically of a metal box, into which the cartridges, five in number, can be dropped haphazard on to a platform depressed for that purpose by hand, the arrangement of the cartridges in proper zigzag fashion ready for use being accomplished automatically, or at worst assisted by a slight shaking of the platform. In addition, it permits of the use of the clip or charger, such as is adopted in the Mannlicher and Mauser rifles. But beyond that general likeness, the two magazines have little in common. Without instituting any odious comparison, it may be said that the Ross magazine is decidedly the simpler in its mechanism, and consists of the fewer parts, three, as against eleven. The platform extends into, and is concealed in the wood of the force end below the barrel of the rifle, and normally the platform is pressed upward by the force of a strong and sufficiently flexible steel spring of Z shape. The platform, however, can be operated readily by hand, it being for this purpose provided, midway along its length, with an extension piece, which comes up on the right side of the rifle barrel through a suitable recess cut in the wood of the stock and hand protector covering that portion of the barrel in such a manner that, though not constituting a marked projection, the visible portion is easily reached by any of the fingers of the left hand when holding the rifle at its center of balance, as would be done naturally during the process of firing and loading. One finger suffices to work this ingenious contrivance for lowering or shaking the cartridge platform, and the more so since its total downward travel in depressing the platform to its utmost extent is less than half an inch. Before leaving this point it should be mentioned that a simple indicator fitted in conjunction with the depressing stud shows at a glance how many cartridges are in the magazine at any given moment, and that missfeeds can not occur from accidentally depressing the platform, as might be the case were a forward movement required to depress it. There is another feature of the magazine which also requires notice here. In accordance, no doubt, with the marked partiality of our war office authorities for a magazine rifle, which may on occasion be worked as a single loader, Sir Charles Ross has provided his rifle with a "cut-off." His conception of a cut-off is, however, in marked contrast to the freak of fancy that fitted our service rifle with the awful atrocity which does duty in that respect, except when it is bent out of shape or broken off. The cut-off of the Ross rifle is worked by an unobtrusive slide on the right side of the breech shoe, which simply drops the interior of the magazine so that the cartridge which happens to be at the top is kept clear of the bolt in its travel backward and forward. For single loading, then, with the cut-off in use, nothing remains but to place single cartridges one by one on top of those held in reserve, and to fire them separately.

In the interval that has ensued between our first inspection of the Ross rifle some months ago and the trial at which we were present at the beginning of December, Sir Charles Ross has not been idle. Sufficient has surely been written here to show that he has produced a military weapon which is absolutely practical in every respect, and on the face of it capable of being handled rapidly and easily, even by comparatively unpracticed users. But he has further devised for use in conjunction with this splendid weapon a system of carrying ammunition that greatly enhances its efficiency. Unfortunately, we are precluded at present from giving a detailed description of this system, which is not yet fully protected; but without breach of confidence this much may be stated, that the cartridges are put up in separate cases into batches of five, each package thus constituting a magazine charge. These cases, which are made in tin or in cardboard to suit climatic and other requirements, are so made that a single motion strips off the cover and the contents can be poured directly into the magazine. The cases, opened or closed, can be carried in a bandolier, and this system at once removes one of the crying evils brought to light in the still-enduring South African war, since it is practically impossible to lose ammunition when made up in this fashion.

Having so far dealt with the rifle entirely as regards its constructive details it remains to speak of it in operation. As is now well known, the Canadian government has lately adopted the Ross rifle for the armament of the Dominion troops. This was not done, however, without submitting the weapon to tests which were probably more severe than any to which a rifle has hitherto been subjected. We are not at liberty, even did space permit of it, to give in detail the nature of those tests, but some idea of their severity and completeness may be gathered from the fact that they were modeled on the tests of the United States Ordnance Board, with every additional rigor of detail that ingenuity could devise. It is enough to say that the Ross rifle emerged satisfactorily from each and every series of trials, with the result that the authorities concerned signified their approval in the manner already indicated. More extended mention may be made of an endurance test made with the rifle that we afterwards saw and handled. This consisted of the firing of 500 rounds in 10 series of 50 rounds each. The total time occupied in actually firing the whole series amounted to nineteen minutes four seconds, the best time for an individual series of 50 rounds being one minute thirty-two seconds, which, curiously enough, happened to be the last of the series, and the worst—which was the first—two minutes thirty-nine seconds. Immediately on completing this test, when the barrel must have been nearly red-hot and the woodwork was actually charred and smoldering, the rifle was tested and found to be in perfect working order.

The trials made in our presence were scarcely of so exacting a nature as those conducted in the Dominion across the seas, but they were nevertheless sufficiently thorough to demonstrate the remarkable qualities of the rifle. A certain number of shots were fired at 100 yards for diagram, under circumstances not particularly favorable to that test, but all the same the grouping showed good results. It may, in fact, be said at once that the whole of the trial, so far as the Ross rifle was concerned, took place under a disadvantage, inasmuch as Sir Charles Ross, who handled the weapon as demonstrator, had only landed from an Atlantic steamer on the previous day, after one of the roughest passages on record, and could scarcely be expected to show his average "form." It follows, therefore, that the actual and undoubted success of his demonstration had a far greater value than might at first sight appear. In earlier Canadian trials of this same rifle, as has been mentioned, he was able to show extreme rapidity of fire, seven out of the ten batches of 50 rounds each being fired well within two minutes per batch. Sir Charles wishes to give us a sample of this rapidity by firing a series of 50 rounds. Apart from being out of "form" himself, he was further handicapped by the fact that, in place of having ten of his ingenious carrier-chargers ready to hand, he had less than half the number, and they had to be recharged in turn to make up the requisite number of rounds, and this work being accomplished by unaccustomed hands, caused several perceptible pauses in the reloading of the rifle. Under all these adverse conditions, however, the 50 rounds were fired within two minutes ten seconds, about the same time as was occupied in firing the second batch of 50 in the endurance test made in Canada. With this result as a basis, an expert volunteer marksman was set to fire a similar number of rounds from the service rifle. The conditions were to fill the magazine and use it as a magazine rifle throughout, without the cut-off, but the marksman was allowed to have the whole 50 rounds at his side ready to hand. After following the smooth operation of the Ross straight-pull, and the ease of loading, it was almost painful to watch the efforts of the expert with his Lee-Enfield and loose cartridges. The time occupied in firing 50 rounds from the service rifle was four minutes forty seconds, or two and one-half minutes longer than with the Ross. In one case there was no hurry, and no taking of the rifle from the shoulder; in the other all was bustle and quick spasmodic actions, to say nothing of loose cartridges dropping about in a manner eloquent of awful waste during the strenuous moments of active service.

Altogether, about 100 rounds were fired from the Ross rifle in our presence, and if this personal test can not be accepted as conclusive, it was sufficient at all events to convince us that the inventor has brought to a state of practical perfection a magazine arm of extraordinary capacity, sound alike in design and construction. It seems well nigh the ideal of what a military rifle should be, and the fact that it has emerged from tests so stringent as those imposed upon it by the Canadian authorities is sufficiently eloquent to need no further elaboration in demonstrating its fulfillment of every possible service requirement.

For sporting purposes the Ross straight-pull magazine rifle has been adapted to the .256 Mannlicher, the .303 and the .370 calibers, and at the present time it is in contemplation to supply it to the .400.—*Arms and Explosives, January, 1902.*

THE HARRIS RIFLE MAGAZINE.

Considerable interest should attach to the new Harris rifle magazine, since we learn on very good authority that this device is receiving serious consideration as regards its suitability for use in the new service rifle, concerning which so much has been written recently. As is well known, the difficulties of adopting a rapid system of loading in conjunction with the existing type of service ammunition are considerable. Experiments have been made in the direction of utilizing the clip or charger methods of supplying cartridges to the magazine, only to find that the system of shaping the base of the cartridge with a raised rim or beading produces difficulties and complications which are nonexistent in the more general type of magazine-small-arm ammunition having a groove in place of the raised rim. It would appear, indeed, that loading by clips or chargers, one or other of which systems are common to practically all foreign military arms, could be adopted in the British service only by making a radical change in the ammunition. Under these circumstances, it almost goes without saying that either system is definitely barred from our use, and that there is a necessity to devise some other method of loading which is not dependent for its efficiency on the shape of the cartridge rim.

The Harris magazine seems to solve the difficulty to a remarkable degree. It consists of a box fitted into the woodwork of the rifle immediately below the receiver. This box does not project below the woodwork, and to that extent resembles the magazines of the later patterns of the Mauser and Mannlicher-Shönauer rifles. Yet, despite its relatively shallow depth, the magazine is sufficiently capacious to contain six cartridges disposed in zigzag fashion on a metal platform of corrugated shape, which thus insures that one cartridge shall lie partially below the level of another. The platform, with the apparatus for raising and depressing it, forms the principal feature of the whole device. Normally it is pressed upward against the cartridges, or, if the magazine be empty, against a stop, by the action of a coiled spring acting through a bell-crank lever, and in this way it raises each cartridge in turn into position to be pushed forward into the chamber of the rifle by the closing of the bolt. But as against this normal condition of things, which is the same in essence as that adopted in well-nigh every system of magazine-loading, the platform is also capable of being depressed by means of a lever placed conveniently for operation by the left hand in holding the fore end of the rifle, this lever pulling the bell crank in direct opposition to the pressure of the coil spring, and thereby causing the platform of the magazine to sink down to its lowest possible limits. An ingenious subsidiary lever fitted to the main lever of the bell crank causes the platform to maintain a horizontal position throughout its travel, this lever being shown in the drawing as pivoted to the bell crank, whereas in the actual example of the magazine which we have examined it had a travel between grooved surfaces on the crank, the final effect being the same in each case.

To those who are used to the slow single-charging method of the present service arm, the working of the Harris magazine is a revelation of simplicity. To charge it, the small thumb lever is pressed, whereby the platform is lowered to the bottom of the magazine box. Nothing remains to be done but to tumble half a dozen cartridges into the magazine recess through the receiver, the only care being to insure that they all fall with the bullet toward the front of the magazine and with the base of the cartridge toward the back. Should they show a tendency to jam in dropping into place, a shake of the platform, communicated by means of the thumb lever, speedily jolts them into proper positions, and when the lever is released altogether, they are found suitably disposed, with the top cartridge ready to be carried forward into the chamber by the return of the bolt. The top edges of the magazine sides are shaped so as to prevent the cartridges from being forced out by the upward pressure of the magazine platform, while at the same time they serve to guide the uppermost cartridge into a central position where it can be in the way of the locking bolt. It should be noted that the use of the Harris magazine in no way affects the employment of the cut-off, so that a rifle so fitted is still capable of being employed as a single-loader, with a magazine of six shots in reserve. If at any time it is desired to empty the magazine without firing, this is done by the simple act of depressing the thumb lever, which actuates the platform. The cartridges at once become loose within the magazine, and on the rifle being turned over they will all fall out into the hand held below the opening of the receiver. It should be evident from the foregoing description that the Harris magazine seems to solve in a practical manner some of the inherent difficulties attending the use of ammunition of the particular pattern affected by the British government authorities.—*Arms and Explosives, July, 1901.*

GREECE.

The Militär-Wochenblatt, Berlin, states that Greece is carrying on experiments with various rifles, among them being the Mauser.—*United Service Gazette, London, June 8, 1901.*

ITALY.

THE ITALIAN SERVICE RIFLE.

The Gazetta di Venezia has recently published some particulars of the 1891 model service rifle which is in general use throughout the Italian army and navy. It appears that this rifle, which is of the Mannlicher-Carcano type, and of .256-inch caliber, has an extreme range of 3,520 yards, which is, according to the journal in question, greater than the ranges of the Austrian and the Swiss rifles, and equal to that of the Lebel, Lee-Metford, and Speed rifles, and is exceeded only by the German Mauser. The same authority gives a comparative table showing the precision of fire of the various rifles, to prove that the Italian model far excels the others. For example, at 330 yards and at 1,100 yards, the Italian Mannlicher plants its shots within rectangles of 9.45 by 10.63 inches, and 53.54 by 72 inches, respectively. As against this, the French service rifle gives rectangles of 26.37 by 27.26 inches, and 115 by 123 inches; the German rifle gives 18.11 by 21.26 inches, and 63 by 117 inches; the Austrian 22.44 by 37 inches, and 88.58 by 137.79 inches, and the Swiss 21.65 by 39.37 inches, and 76 by 149 inches for the same two ranges. These figures appear to be the result of a series of practical tests with the various weapons mentioned, but they are neither complete nor particularly convincing. The other details, moreover, do not fully agree with those of our own Text-Book of Military Small Arms and Ammunition, which is generally regarded as a leading authority on the subject.—*Arms and Explosives, October. 1901.*

JAPAN.

[REPORTED BY CAPT. JAMES H. REEVES, FOURTEENTH CAVALRY, UNITED STATES MILITARY ATTACHÉ AT PEKIN AND SEOUL.]

The celebrated Murata rifle of the Japanese army is being replaced by a newer model called the Murata, "30th Meiji" (30th-year model), the exchange to be completed this year. The new gun is manufactured at the small arms arsenal at Tokyo. The rifle and the carbine differ only in the length of the barrel, the latter being about 18 inches. The carbine weighs 3½ kilograms, while the rifle weighs 4. The rifle is said to have a flat trajectory of about 600 yards. It is a magazine gun, caliber 6½ millimeters. The magazine is loaded from a clip by a single motion and carries five cartridges. The bolt is withdrawn and the cartridges are pressed directly through the bolt slot into the receiver under the stock just in front of the trigger guard. The gun has no cut-off and can not be used as a single-loader. It possesses an excellent feature in that after the last cartridge in the magazine has been fired the carrier of the magazine rises and locks the bolt, when the bolt has been withdrawn to extract the shell. The bolt is then immovable, and being locked in the open position at once attracts the soldier's attention and effectually prevents him from going through the motions of firing when there is nothing to fire. The carrier spring is apparently very weak—too weak for the work it is expected to do.

The belt, cartridge box, etc., are made of fair leather. The box holds six clips of five cartridges each. There are usually three boxes worn, two in front and one behind on the waist belt. This makes the number of cartridges carried 90, which seems rather small for a magazine gun, especially as it can not be used as a single-loader.

The revolver of the cavalry is shorter and heavier than ours. It is a six-shot, with double action and a caliber of 9 millimeters. The break and mechanism are similar to the Schofield S. & W.

PERSIA.

The Russian paper Zakaspiyskoye Obozrenie writes that according to official English data a considerable increase is noted in the import of arms to the Persian ports. Some ten years ago a breechloader was a rare thing, while at the present time both natives and foreigners carrying excellent arms are often met with, and there is seldom a man in the vicinity of Bushir who does not possess his Martini-Henry rifle. The customhouses, which are in the hands of Belgians, watched the coasts, and not long ago an import of 1,000 rifles and 200,000 cartridges was intercepted, but smaller ports have arms brought to them unmolested. The Persian government endeavors to stop, by two small patrol gunboats, this importation of arms, yet this measure is not sufficient. The central market for arms is Maskat, where great numbers of weapons are imported and exported. In 1900, 25,000 rifles and 3,000,000 cartridges were brought there, largely by English vessels. It is more than probable that the restless Indian mountain tribes get their arms through this source.—*Allgemeine Schweizerische Militärzeitung, November 2, 1901.*

PORTUGAL.

The Militär-Wochenblatt, Berlin, states that experiments are now being made with the Mannlicher and Mauser.—*United Service Gazette, London, June 8, 1901.*

SWITZERLAND.

THE NEW SHORT RIFLE, MODEL 1899–1900, FOR AUXILIARY TROOPS.

The Allgemeine Schweizerische Militärzeitung of March 16 states that position artillery, fortress troops, telegraph companies, balloon and cycle detachments will be armed with a new short rifle of 7.5-millimeter caliber, the system and ammunition of which will be the same as that of the infantry rifle, and that it will be named "the short rifle, model 1899–1900."

The new rifle differs in the following parts from the infantry rifle:

(*a*) The length of the barrel is equal to that of the cadet rifle (593 millimeters). The total length of the rifle is consequently less than that of the infantry rifle by 203 millimeters.

(*b*) The weight of the short rifle is 3.6 kilograms, that of the infantry rifle 4.3 kilograms.

(*c*) The magazine is constructed so as to contain six cartridges.

(*d*) The short rifle is supplied with the bayonet cutlass used with the engineer rifles.

For the rest the shape is very much like that of the infantry rifle. Up to ranges of 1,000 meters its precision is equal to that of the infantry rifle.

By the adoption of the short rifle the weight carried by the soldier has been reduced and during work the rifle may be worn slung across the shoulder. This arm will allow the troops to guard against surprises by the hostile cavalry.—*Memorial de Artilleria, May, 1901.*

A NEW SWISS MAGAZINE RIFLE.

The Swiss military authorities are said to be now engaged in testing a new type of magazine rifle, the mechanism of which, according to rumor, is to effect a revolution in the rifle-making of the future. This remarkable weapon is the invention of M. Fleury, an engineer living at Aesch, near Basel, who is said to have got hold of the key to the whole question of magazine rifles. Probably this is a somewhat cryptic method of stating that the rifle embodies new features of more or less practical value, but as the Swiss military authorities are still preserving the utmost secrecy with regard to M. Fleury's invention, it is difficult to gather quite the direction in which novelty is shown, or to know how far it goes toward revolutionizing the construction of magazine rifles generally.—*Arms and Explosives. 1901.*

TABLE D.—*Comparative table of automatic pistols.*

	Parabellum pistol.	Mannlicher pistol.	Mauser pistol.	Browning pistol.	Borchardt pistol.	Colt pistol.	Revolver, Colt, U. S. Army model, cal. 38.
Caliber ... millimeters	7.65	7.6	7.63	7.65	7.65	8.9	8.9
Magazine:							
Number of cartridges carried in	8	5	*10	7		7	
Barrel:							
Length of ... inches	4.8	7.25	5.5	4.02	7.5	6	6
Rifling:							
Number of grooves	4		4	5	4	6	6
Length of twist to the right ... inches	9.8		9.8		9.8		
to the left ... inches						17.3	16
Bullet:							
Weight of ... grains	92.6	112	85		85	105	150
Length of ... inches	.6						.72
Powder charge:							
Weight of ... grains	5.1	4	7.75		7	7.8	4.5
Cartridge:							
Total weight of ... grains	161.8	171.5	162.8	121.1	161.8	178	
Complete weapon:							
Weight of	1 lb. 13½ oz.	2 lbs. 2 oz.	2 lbs. 7½ oz.	2 lbs. 5.7 oz.	2 lbs. 13 oz.	2 lbs. 4 oz.	2 lbs. 1 oz.
Number of component parts		26	†36			46	
Mean time per one shot in 30 rounds ... seconds		8.02	2.88			2.66	
Percentage of hits in 30 rounds fired at—							
75 feet ... per cent			56.7				
100 feet ... per cent		63.3				60.7	
Maximum range ... yards	1,969						
Velocity, initial ... foot-seconds	1,148				1,312		750
Velocity, 53 feet from muzzle ... foot-seconds		798.6	1,342			1,259	
Penetration:							
At 55 yards—							
In fir wood ... inches	5.9				(‡)		
In beech wood ... inches	2.36						
At 25 yards—							
In white pine ... inches		6.3	8				4.97
In pine butt ... inches						7	

*This pistol is manufactured also with two other sizes of magazine, holding 6 and 20 cartridges, respectively.

† Not including stock, which consists of 17 parts.

‡ At 217 yards penetrated two boards 1 inch thick each and 1 inch apart.

VI.—AUTOMATIC PISTOLS.

Belgium has adopted the Browning 7.65-millimeter automatic repeating pistol for the officers of the army and the noncommissioned officers and men of the gendarmerie. It is manufactured under government supervision at Herstal.

Switzerland has adopted the 7.65-millimeter automatic Parabellum pistol, Borchardt-Luger system, model 1900, for mounted troops. It is manufactured by the German arms and ammunition factory at Berlin.

In Austria-Hungary experiments have been made with a Mannlicher pistol, but with unfavorable results.

Germany has been testing the Parabellum pistol and the 7.63-millimeter 10-loader Mauser pistol. Both these weapons were given to officers, officials, and noncommisioned officers of the German East-Asiatic expedition for experimental purposes.

The United States is experimenting with the Borchardt-Luger Parabellum pistol. Tests have been made by the Ordnance Department of the Mauser (7.63-millimeter), Mannlicher (7.6-millimeter), and Colt (0.38 caliber) pistols. See Report of the War Department, report of the Chief of Ordnance, 1900.

The following classification of automatic pistols by A. Fleck is an extract from his article published in Kriegstechnische Zeitschrift, second Heft, Berlin, 1901, quoted by permission:

The best known automatic pistols may be divided into the following classes:

1. Pistols with mechanism not locked.

(*a*) Those in which the bolt is merely pressed against the barrel by a recoil spring and recedes upon the weapon's being discharged.

(*b*) Those in which the barrel, being under the pressure of a barrel spring, advances upon the discharge of the weapon.

2. Pistols in which the bolt is locked before discharge, and upon discharge the barrel and the breech mechanism coupled to it recede a certain distance before the unlocking takes place.

(*a*) Bolt mechanism with locks entering from below.

(*b*) Bolt mechanism, the locking and unlocking of which are effected by the bolt swinging sideways, the bolt being provided with a locking lug.

(*c*) Bolt mechanism moved and locked by a jointed lever.

(*d*) Bolt mechanism moved and locked by a block swinging up and backward.

3. Pistols with fixed barrel and locked at the moment of discharge.

Regarding the magazine the following classification may be made, viz, pistols with magazine in the stock and those with magazine in front of the stock or trigger.

With regard to mechanical action, pistols may be classified as automatic and semiautomatic. The so-called automatic pistols effect by means of the recoil the unlocking of the bolt, the extraction and ejection of the empty cartridge case, the feeding of another cartridge into the chamber, the cocking of the trigger or firing pin, and the locking of the bolt ready for firing. In the so-called semiautomatic pistols only the operation of loading is effected by the recoil, while the cocking of the trigger must be done as in the case of the revolver.

As a detailed description of the various systems would occupy too much space, only a short sketch of the characteristics of certain models is given.

PISTOLS WITH MECHANISM NOT LOCKED.

The honor of having produced the first model of this kind is due to the Bergmann firm. The surprising proof was given thereby that firearms up to a certain size can produce good results even without locking the bolt. In weapons of this class the inertia of the bolt and the resistance of the recoil spring cause the bolt to recede so slowly as to allow the smaller and lighter projectile to leave the muzzle of the barrel before it is possible for the gases to escape to the rear. Thus no propelling gases are lost and the pressure on the base of the cartridge case is sufficient to force back the bolt, to cock the piece, to extract and eject the empty cartridge case, and compress the recoil spring. The recoil spring then actuates the insertion of another cartridge and the closing of the bolt.

In model 1896 (fig. 17) Bergmann furnished to the public a very useful independent firearm, of which thousands have been placed on the market in all parts of the world. The construction is briefly as follows:

The bolt (6) is pressed against the rear end of the barrel by a spiral spring, the recoil spring (5), which bears against the front face of the guide (4). When a cartridge is exploded by the blow of the hammer on the striker (3), the expansion of the gas exerts itself in all directions, setting in motion the movable parts, namely, the projectile and the breech mechanism. The smaller and lighter projectile naturally assumes a much greater velocity than the heavier bolt, upon which, besides, the pressure of the recoil spring bears. The rearward movement of the bolt is further checked in its speed by the friction of the expanded cartridge case against the walls of the chamber. By its rearward movement the bolt throws the hammer into the cocked position.

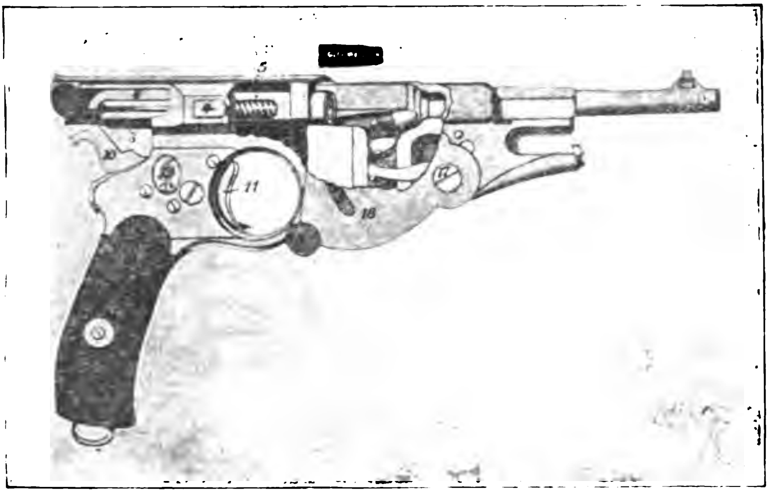


Fig. 17.

When the bolt has completed its rearward movement, it is again driven forward by the recoil spring and at the same time shoves the uppermost cartridge out of the magazine into the cartridge chamber, and the weapon is again ready for firing. Upon discharge by pressure on the trigger (11) the above-described operation is repeated.

The magazine is not a closed one, as are those on most repeating arms, but is opened on the side by a handle, which feature offers great advantages in loading, unloading, cleaning, etc. The cover of the magazine (18), which revolves on an axis (17), has an aperture on the side through which the number of cartridges in the magazine, if any, can always be seen. Another special aperture renders it possible to observe whether there is a cartridge in the barrel.

Shortly after the first Bergmann pistol became known there appeared a similar weapon made by Mannlicher (model 1894) (fig. 18). This semiautomatic pistol is characterized mainly by the forward movement, upon discharge, of the barrel, which is held against the rear of the frame. This model represents a new principle in automatic action, the forward movement of the barrel being principally brought about by the friction of the projectile in the barrel. The various parts and the manner of their working can be seen from the drawing.

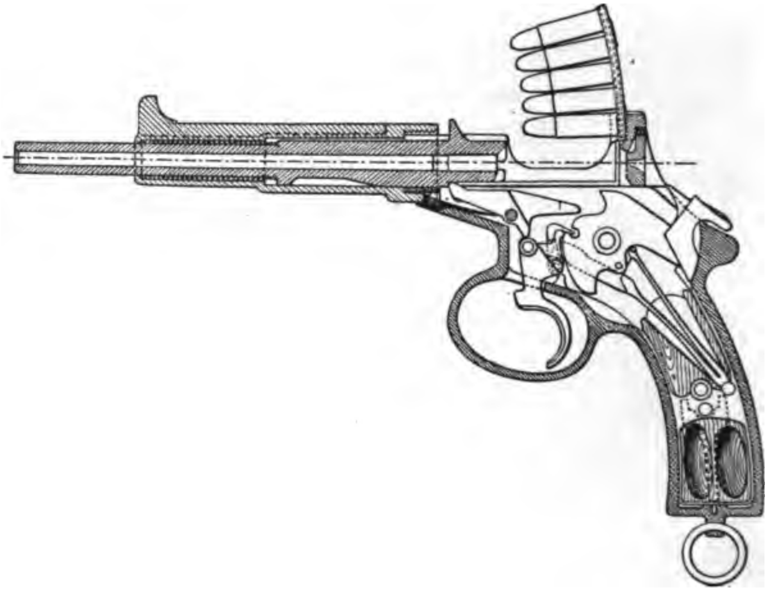


Fig. 18.—Mannlicher semiautomatic repeating pistol, with advancing barrel and packet feed, model 1894. Lock cocked, barrel pushed forward.

In order to discharge the weapon the hammer can be cocked either automatically, by pulling the trigger as in a double-action revolver, or with the thumb of the hand holding the pistol.

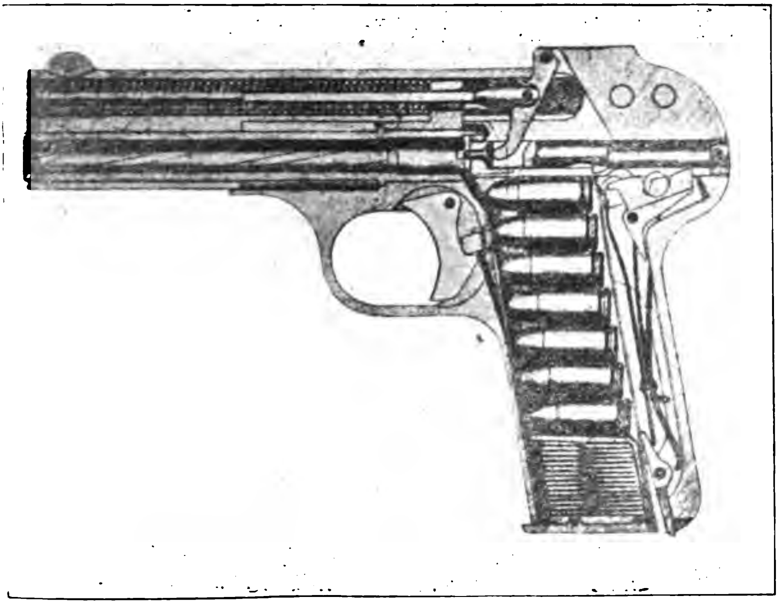


Fig. 19.

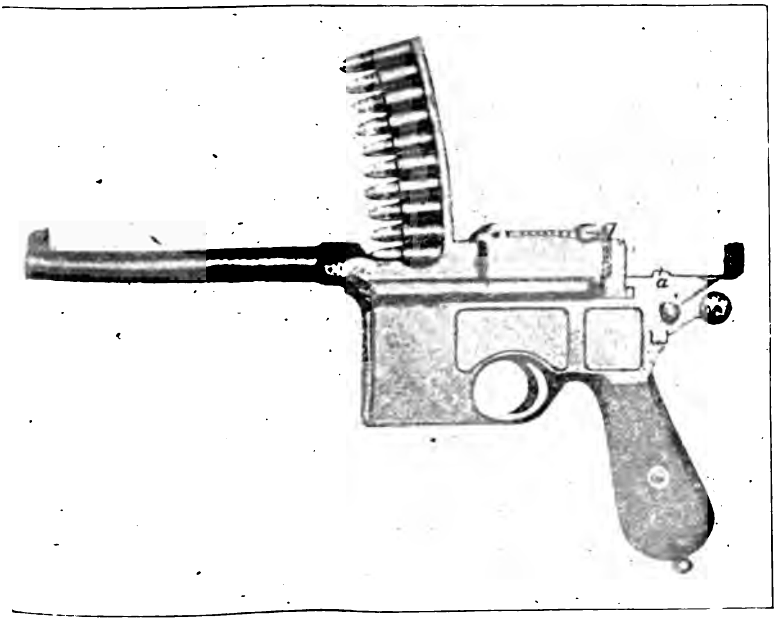


Fig. 20.

Upon discharge the barrel slides forward, operating at the last moment the extractor which ejects the empty shell, held to the rear by two ribs on the rear of the frame. As the pressure of the trigger can not cease immediately, the barrel is held in its foremost position by the lever for that purpose. In the meantime the next cartridge in the magazine is raised.

When the pressure of the trigger ceases, the lever for holding the barrel forward descends and the barrel springs back over the cartridge against the rear of the frame. The pistol has a caliber of 8 millimeters. The magazine, which contains 7 cartridges, is situated in the stock. The lock mechanism is arranged alongside the magazine.

As a third and the latest pistol of this kind the Browning pistol (fig. 19) remains to be mentioned. It is especially distinguished by its extremely compact construction, the magazine being in the stock, and the recoil spring and firing spring being one. This pistol, in which the recoil first acts on the movable upper part which at the same time forms the breech mechanism, operates similarly to the Bergmann pistol.

The length of the whole weapon is $6\frac{1}{2}$ inches and the height $4\frac{1}{12}$ inches. At 217 yards the projectile will penetrate two boards 1 inch each, one placed an inch behind the other. As the pistol is very flat and has no projecting parts, it can be thrust into the breast pocket like a cigar case and is therefore very well suited for the use of the general public, as for instance, bicyclists and tourists. The Browning pistol is not so well suited for military purposes, certain parts, such as axes and pins, being too weak.

All these pistols with spring breech mechanisms work well, generally speaking, but do not insure the degree of safety which must be required for a military weapon. For instance, an unusually large amount of friction between the projectile and the bore, produced by rust or fouling, will cause the breech mechanism to rise too soon, the powder gases to escape to the rear, and the projectile to jam in the barrel. The same thing occurs when the ammunition used has not been carefully prepared and when the powder in the cartridge is varied.

PISTOLS WITH THE BOLT RIGIDLY LOCKED BEFORE DISCHARGE AND WITH MOVABLE BARREL.

In these pistols, hitherto the most perfect of all, the barrel, together with breech mechanism coupled to it, slides back a short distance under the pressure exerted by the powder gases developing upon discharge. This movement serves at first only to unlock the bolt, which at the same time has imparted to it sufficient energy to overcome the resistance of the recoil spring and completely open the breech, and in some cases, also to cock the hammer or firing pin and eject the empty shell. By means of the recoil spring which actuates the bolt, and which is compressed by the bolt sliding to the rear, the uppermost cartridge in the magazine is shoved into the chamber, the bolt locked, and the barrel pushed forward.

To this class belong the Mauser pistol (fig. 20), the Mannlicher pistol, model 1896, the Bergmann pistol, model 1897 (figs. 21 and 22), the Parabellum pistol of the Borchardt-Luger system, and the model 1896 pistol of the Spandau small-arm factory (figs. 23 and 24). In the model 1896 Mauser and Mannlicher pistols the locking of the bolt is effected by a bolt lock which engages in a notch in the underside of the bolt and which, after the barrel and bolt have moved a short distance to the rear, drops downward. In fig. 20, *a* shows the notch on the bolt of the Mauser pistol.

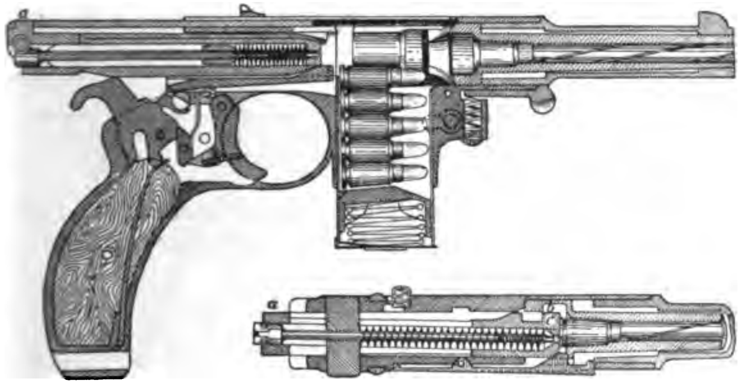


Fig. 21. **Fig. 22.**
Bergmann pistol, model 1897.

In the model 1897 Bergmann pistol (fig. 21) the bolt is unlocked as follows: The bolt, after the first rearward movement of the barrel, swings sideways about the stud *a* (fig. 22), whereby the locking lug *c* on one side of the bolt is removed from the notch *b*. The Parabellum pistol of Borchardt-Luger holds the breech mechanism rigidly locked as long as the two branches of the jointed-lever mechanism are in a straight line. The bolt is unlocked only when, after the rearward movement of the barrel, the cheeks of the jointed lever strike the curved side plates of the frame and the lever bends upward.

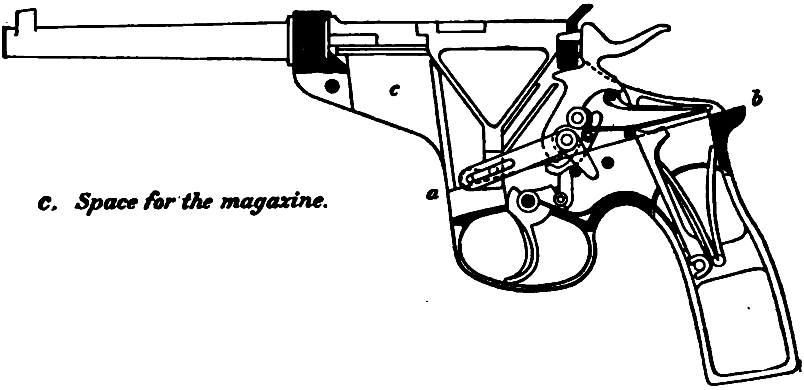


Fig. 23.—Semiautomatic pistol having the breech mechanism rigidly locked before discharge, an inclined recoil plane, and self-cocking device, model 1896, of the Spandau rifle factory.

In the model 1896 Spandau pistol (figs. 23 and 24) the locking is done by a block which, after a short rearward move-

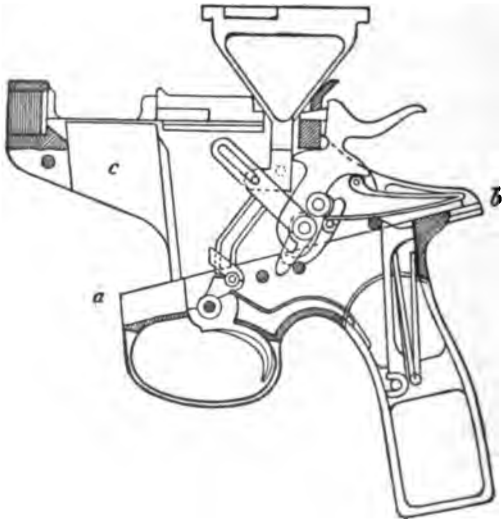


Fig. 24.—The same, immediately after discharge.

ment of the upper part of the pistol upon the lower part, moves up and appears at the top. The rearward movement of the upper part of the pistol upon the lower takes place in the pistol, in contradistinction to other models, not in the rearward prolongation of the axis of the bore, but on an inclined plane *ab*.

Mauser and Mannlicher use fixed magazines and loading clips; the others use magazines attachable from below. The Parabellum pistol has the magazine in the stock and no hammer; the others have hammers and have the magazine situated further forward. Mauser, Mannlicher, and Bergmann have the cartridges lying over and beside one another, the others only over one another. The model 1896 Spandau pistol is a semiautomatic weapon with a self-cocking device as in the revolver. All the others are entirely automatic.

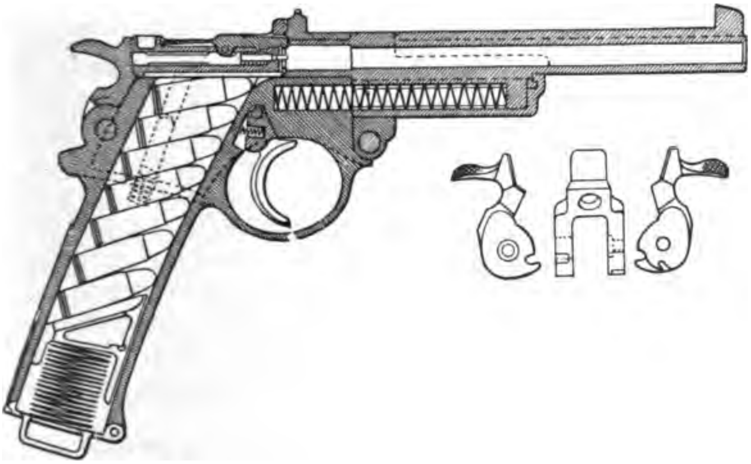


Fig. 25.—Mannlicher automatic repeating pistol with fixed barrel and packet feed, model 1900.

The Mauser and Parabellum pistols have a caliber of 7.65 millimeters, the Bergmann 7.82 millimeters, and the Spandau 8 millimeters. The projectiles of the Mauser and Bergmann pistols attain a velocity of about 400 meters per second at 25 meters from the muzzle, those of the model 1896 Parabellum pistol about 350 meters.

PISTOLS WITH A FIXED BARREL AND IN WHICH THE BREECH MECHANISM IS LOCKED AT THE MOMENT OF DISCHARGE.

Only one model of these pistols will be treated of here, namely, the model 1900 Mannlicher pistol (fig. 25). This model belongs to the group of automatic weapons with fixed barrel and with breech mechanism operated by the recoil, the locking being effected by the hammer at the moment of discharge. It is characterized chiefly by a very short breech mechanism, the sides of which form a frame grooved inside on both sides and sliding along parts of the stock. It is characterized further by the peculiar form and situation of the hammer, which is cocked by the receding breech mechanism and renders it possible to arrange the component parts of the lock on the exterior surface of the stock in such a way that the whole inside of the latter can be used for a magazine. As a result of this arrangement it was possible to make a repeating pistol of unusual simplicity and lightness.

With this class of pistols may be also placed those with so-called semirigid breech mechanism, with which thorough experiments are being made.

It would be a very difficult matter to decide which of the afore-mentioned pistols is the best, as each one has its advantages and disadvantages. For private persons who merely require a weapon accurate for sporting purposes the choice is only a matter of taste, as all the known models fire very well at short ranges. From a military standpoint, on the other hand, great demands must be made in view of the great number of models offered and of the experience gained in late wars. This is especially the case inasmuch as the improvements being constantly effected during the last few years and months justify the supposition that still greater perfection will be reached.

When the first long-range automatic pistols of Borchardt, Bergmann, and Mauser appeared in the market many laymen thought that these excellent weapons might be welcomed as a substitute for the cavalry carbine. It was desired to lighten the trooper's armament and enable him to defend himself against several assailants by rapid firing. The cavalryman himself, however, had not been taken into this reckoning. Although it can not be denied that a light automatic firearm may be very useful to single mounted orderlies and patrolmen in order to clear their way in difficult cases, still the cavalryman in general is the very one who needs a long-range weapon as nearly as possible equal to the infantry rifle. If, therefore, we have to leave out of consideration the idea of a large automatic carbine-like pistol for the cavalry, we may also go a step further and demand a weapon as light and handy as possible for all troops which hitherto carried the revolver.

The greatest demand must be made with regard to accuracy of fire. The possibility of firing at ranges over 200 to 300 meters may be given up as unattainable, but it must be insisted upon that the stopping effect in all cases be excellent. The pistol shot should, above all things, stop on the spot an enemy who has approached to within close range. An excessive feeling of humanity in this matter would be thoroughly false and would have eventually to be paid for by blood.

A good stopping effect can be attained by a caliber not under 8 millimeters and by a projectile flattened in front. If the flattening of the projectile does not produce the required effect, such effect can probably be obtained by a completely jacketed bullet with cup-shaped point, as by such a bullet stronger aërodynamic and hydrodynamic phenomena are produced in the shot channel. That such a projectile is as inhumane as the soft-lead pistol bullets with cup-shaped head is not probable, as no deformation takes place in the body.

In order to obtain a light weapon a very important thing will be the location of the magazine in the stock, as the dimensions are thereby greatly reduced. The simplest construction, with but few component parts so arranged as to be seen at a glance, simple, and easily replaced, is also urgently to be demanded, for the owner, even when without great technical knowledge, should always be able to convince himself whether his weapon is in order; only in this manner will he gain confidence in it and not lose his coolness in the moment of danger.

Unfortunately it can not be asserted that the best automatic pistols extant, in which a rigid locking takes place before discharge, show the advantage of great simplicity. It is, therefore, fortunate that experiments are still being made with a view to approaching still nearer to the ideal by using the simplest means and form of construction. Special experiments are being made with a weapon in which the barrel is firmly attached and the bolt locked in a semirigid manner.

In order to inclose as great a number of cartridges as possible in the stock (15 to 20), it is necessary that they should lie above and beside one another. In order, however, that the handle may not become too thick, it is necessary, instead of introducing the magazine into the stock, to use as a stock the magazine itself. Cartridges 30 millimeters long can be inclosed in a stock of a very convenient size. Two such attachable stock magazines ought to be enough for a single weapon, for they can be made to contain from 30 to 40 cartridges.

A good safety device on a pistol must be required to preclude all possibility of accident. Such a device must work automatically, or else it must be visible from outside whether or not the safety lock has entered the notch in the hammer, etc., as the ideas of the marksman are easily confused in critical moments.

The question whether an automatic or a semiautomatic pistol should be adopted will be very hard to decide. If an automatic pistol be introduced, it is evident that a certain number of accidents can not be avoided, for it is well known how easily the nerves give way, the finger jerks, the next shot goes off unintentionally, and perhaps a comrade may be struck. By providing a long trigger pull this danger might be considerably diminished.

A good expedient would be to construct the weapon in such a manner as to enable it to be rendered automatic or semiautomatic by inserting or withdrawing an intermediate part. It would thus be possible to give one soldier the one and another soldier the other kind of weapon, according to necessity, without having to enter into the manufacture of two different models. In order to render errors and accidents less likely to occur it appears necessary to have a hammer, because it is then easier to tell whether the weapon is cocked or not, and because it can be uncocked with great safety. Another requirement ought to be that the hammer be worked with the thumb as in the revolver.* In order to have the greatest possible degree of perfection a self-cocking device, as on the revolver, is desirable, as it is often important to fire the very first shot quickly. Furthermore it should be easy to tell whether there are any cartridges left in the magazine, and it should be possible to take the weapon apart without special tools. It would also be desirable to have a wiping or unloading stick on the weapon.

A pistol case capable of being used as an attachable stock may be practical in many cases, but is not absolutely necessary, for in the moment of self-defense the main thing will be sure free-hand firing.

---

*This is difficult in the Mauser pistol.

That free-hand pistol firing will again come into greater repute when the army discards the old revolver and adopts a modern arm of precision, is evident, and we shall then soon have the pleasure of seeing an art revive which has long remained in a backward state.

VII.—EXPLOSIVES.

[Compiled by First Lieut. H. B. Ferguson, Corps of Engineers.]

The results due to the introduction of smokeless powder are important factors in the present high efficiency of modern guns of all calibers. The advantage of smokelessness is apparent, especially in field operations. The high potential and progressive burning of smokeless powder have made it possible to obtain, by increasing the length of guns, higher velocities than with the old black or brown powders, and at the same time to keep the pressures in the guns within the limit fixed by possible strength in gun construction. The small amount of residue, by obviating the necessity of frequently sponging out, permits increased rate of fire. The reduced weight of charge increases the number of rounds that can be carried by a given amount of transportation.

The object has been to obtain a smokeless powder that will uniformly give the desired positive results as to maximum velocity with limited pressure and minimum residue, and that will not detonate nor deteriorate because of long storage or climatic changes, nor erode the gun by excessive heat or by chemical action, nor explode during the handling necessary in transportation or loading.

The smokeless powders used for military purposes are all manufactured from nitrocellulose colloided by a solvent and molded, rolled, or pressed into forms whose density, size, and shape correspond to the various calibers.

The two principal types of smokeless powder, (*a*) nitroglycerin-nitrocellulose and (*b*) nitrocellulose, are usually referred to as nitroglycerin powders and gun-cotton powders, respectively.

The nitroglycerin powders are essentially mixtures of nitroglycerin and nitrocellulose. In case all or part of the nitrocellulose is not soluble in the nitroglycerin used, another solvent, as acetone in cordite or benzol in ballistite, is added and afterwards evaporated.

In the gun-cotton powders the nitrocellulose may possibly be in a single form and of that particular degree of nitration that can be colloided by the solvents used, as is claimed for pyrocollodion, or else it may be a soluble mixture of nitrocelluloses of different degrees of nitration, as is pyroxylin. Nitrates may or may not be added.

The general opinion at present is in favor of the gun-cotton powders. Nitroglycerin powders are used only by England and Austria, which countries use cordite; Norway and Sweden, which use ballistite, and Italy, which uses ballistite and solenite.

The advantages claimed for cordite and for nitroglycerin powder in general are that they are cheap and comparatively easy to make, stable and safe to handle in all climates, and give high velocities with smaller charges than do gun-cotton powders. The one objection to cordite is that it erodes the guns. The erosion is caused chiefly by the heat of explosion of nitroglycerin, which heat is greater than that produced by the explosion of gun-cotton powder. After firing a comparatively small number of rounds this erosion decreases the initial velocity and affects the accuracy of fire. On account of the erosion of the British guns in South Africa, a committee was appointed to consider a substitute for cordite.

"The result of the inquiries has been the adoption by the committee of a new smokeless powder, to be known as 'Cordite M. D.,' which, it is understood, will gradually replace cordite. It is stated that the new explosive has a nitrocellulose base, and it is believed to contain also a certain proportion of nitroglycerin, though not so much as cordite. Presumably, its chemical and ballistic qualities are satisfactory. It will not, we believe, generate so much heat as cordite, and in this characteristic is found the reason for the nonerosion of gun tubes. Trials of the explosive will be awaited with interest."—*Army and Navy Gazette, February, 1902.*

The stability of gun-cotton powder as now manufactured is fairly well proven by experiments in various climates, and it can be manufactured safely in large quantities. It is admitted that, in practice, a little nitroglycerin aids in securing the desired consistency in the working and in the finished product, and also adds slightly to the ballistic and keeping qualities. The following article by a writer in Sweden is taken from London *Engineering*, July, 1901:

"In this country nitroglycerin powders have been used by the navy since 1892, and have of late been adopted also for certain heavy guns belonging to the coast defense; whereas the army is using principally a nitrocellulose powder, manufactured at the government factory.

"Up to 1896, smokeless powder was used by the navy only for the light quick-firing guns. That year it was adopted also for the 12-centimeter (4.7-inch) quick-firing guns.

"The nitroglycerin powder employed for these purposes was ordinary ballistite containing 50 per cent nitroglycerin and 50 per cent nitrocellulose of about 12 per cent nitrogen. The heating and erosive effect of this powder is very much the same as that produced by cordite. By using a more suitable shape of the grains—tubes instead of cords—it was, however, possible to obtain a satisfactory velocity without too excessive pressure, thus avoiding a too great erosive effect on the bore of these light guns.

"In 1897, during firing experiments carried out at Bofors with a 15-centimeter (6-inch) quick-firing gun with very small chamber space, it was found that the heating effect of the powder was too considerable to make it suitable for a gun of this caliber. After a few rounds a considerable washing away of the metal round the seat of the projectile was perceptible. After three rounds, using the same metal cartridge case, this was completely worn out at the edge, and could not be used further.

"It was then found necessary to alter the composition of the powder, in order to obtain a lower temperature of combustion, and consequently less corrosive effect.

"This aim was arrived at by lessening the percentage of nitroglycerin to 25 per cent, and using a 'moderant,' which is at the same time a solvent for nitroglycerin and nitrocellulose. In this way it is easy to obtain a composition giving even a lower development of heat and larger volume of gas per unit of weight than a pure nitrocellulose powder containing a low percentage of nitrogen, such as, for instance, the German Troisdorf powder.

"To prove this the following results obtained by calorimetric test of the two powders may be cited:

Kind of powder.	Heat units per gram.	Volume of gas of combustion.			Heat volume of gas per gram.*
		Permanent.	Aqueous.	Total.	
Nitroglycerin powder (yielding 11 per cent N*)	922	813	165	978	901.7
Troisdorf powder (yielding 11.98 per cent N*)	943	750	172	922	870.5

*Nitrogen determined by nitrometer.

"As will be observed, the nitroglycerin powder is capable of performing a slightly greater amount of work per unit of weight, under the same conditions, although the heat produced per gram is somewhat less.

"These theoretical calculations have been upheld by actual experience, the modified nitroglycerin powders having given satisfactory results in various heavy guns, up to such as 25.4-centimeter (10-inch) caliber.

"The experience in Norway, where a similar nitroglycerin powder is used by the army as well as by the navy for guns of all calibers and also for the army rifle, seems to be very much the same as in Sweden. Since 1893, when the powder was first introduced into the service, no serious complaints have been made against it.

"In taking cordite as the representative type of powders containing nitroglycerin, as has been done by the author of a paper which appeared on March 8 of your journal, and condemning the whole class on account of the demerits of cordite, a great injustice is certainly done toward the more modern types, which do not share the same faults. For it can hardly be denied that cordite is in several respects an antiquated powder, however great may have been its merits at the time of its first appearance, and even then these merits were disputed.

"Thus the cord shape is not by far comparable to the tube or multiperforated grain, when a high ballistic effect with a moderate pressure is desired.

"Further, the use of insoluble nitrocellulose, together with a moderant—vaseline—which is not a solvent, either for nitroglycerin or nitrocellulose, causes serious disadvantages, which are still further aggravated by the excessive percentage of nitroglycerin contained in the powder. By exposing cordite to heat and pressure it is easy to cause the nitroglycerin to separate from the nitrocellulose, in a way very similar to the squeezing out of water from a wet sponge. It is all but possible that the same phenomena occur, at least partly, in the combustion of cordite in a gun. If this be so, the nitroglycerin will burn slightly quicker than the nitrocellulose and vaseline, producing a higher temperature in the beginning of combustion of the charge than the composition of the powder and the calorimetric data would indicate.

"A further disadvantage of cordite, which does not exist with the low-percentage nitroglycerin powders containing 'soluble' nitrocellulose, is the exudation of nitroglycerin which takes place at a low temperature.

"The main advantage of the nitroglycerin powders are, in the view of your correspondent, their absolute freedom from porosity. A nitrocellulose powder containing a few per cent of volatile solvent is apt to lose part of this during prolonged storage. The evaporation of the solvent will cause a tendency of the interior of the grains to contract. As the surface is hard and brittle, the grains will be exposed to internal stresses which may, under favorable conditions, cause their breaking up in the bore of the gun, thus producing an excessive pressure.

"In the evaporation of the solvent, a certain porosity is unavoidable. This porosity causes a certain hydroscopicity of the pure nitrocellulose powders, and a tendency to give uneven pressures.

"The advantages claimed for the pure nitrocellulose powders are a high degree of chemical stability and low temperature of combustion. As it seems, however, quite feasible to arrive at the same results, and gain other very important advantages, with a nitroglycerin powder containing a low percentage of nitroglycerin, such powders will probably, as is pointed out by Mr. Willcox [in discussing the development of smokeless powder in the United States], prove the most satisfactory for the future."

The following is taken from the *Rivista di Artiglieria e Genio:*

"POWDERS USED BY DIFFERENT NATIONS.—Nitroglycerin powder is used for small arms in the following countries: (1) Italy, which uses ballistite and recently also solenite; (2) England, which uses cordite; (3) Norway, which has adopted the Italian ballistite. All other countries, with the exception of Greece and Portugal, which are still using black powder, use gun-cotton powder, mostly in the shape of flakes. [See Table "C."]

"In Germany, France, and Russia pure gun-cotton powder is used almost exclusively for the modern types of guns, with a few exceptions, as, for instance, for German howitzers and mortars.

"In England, Italy, and Austria, on the other hand, only nitroglycerin powder is used for guns, although in England extensive experiments have been made with gun-cotton powders, which have given good results.

"Brazil is about to build a factory for smokeless powder, and has invited competitors to submit results of tests made with pure gun-cotton and with gun-cotton mixed with nitroglycerin (up to 20 per cent). It would therefore seem as though that country had not yet decided in favor of either kind of powder.

"In Japan at present the tendency is to give preference to nitrocellulose.

"Turkey purchased in March, 1900, 260,000 kilograms (573,000 pounds) of Rottweil smokeless powder. It appears that in future this country intends to manufacture its own powder. (Sultan's decree of August 20, 1900.)

"Below we give the different kinds of powder used for the guns of the great powers of Europe:

"1. Austria:

  (1) 2-millimeter (0.08-inch) powder M. 93 for field, mountain, siege, and fortress guns—nitroglycerin.

  (2) Powder in fine and coarse grains, prismatic powder, and powder in cubes for old type 31 and 28 millimeter (12.2 and 11 inch) guns—nitroglycerin.

"2. France:

  (1) Powder in flakes for field, fortress, siege, coast, and naval guns.

  (2) Pyrocollodion powder—nitrocellulose.

  (3) New 'B. N.' smokeless powder—nitrocellulose.

  (4) Different kinds of powder, in grains, for guns of old type; also some kinds of brown prismatic, and other powder for large naval guns.

"3. Germany:

  (1) Gunpowder, 1896, for guns M. 96.

  (2) Gunpowder in flakes for fieldpieces M. 73 and 12-centimeter (4.75-inch) guns—nitrocellulose.

  (3) Powder in large flakes for 15-centimeter (6-inch) long guns, 15-centimeter and 21-centimeter (6-inch and 8.25-inch) built-up guns (Ringkanonen), and 21-centimeter jacket guns (Mantelkanonen)—nitrocellulose.

  (4) Powders in cubes for field howitzers and field mortars—nitroglycerin.

"4. Great Britain:
  (1) Cordite, new, for all rapid-fire and breech-loading guns—nitroglycerin.
  (2) Cordite, old—nitroglycerin.
  (3) Shultze powder (under tests)—nitrocellulose.
  (4) 'B. E. C.' powder (under tests)—nitrocellulose.

"5. Italy:
  (1) Ballistite for 4.2-centimeter (1.65-inch) rapid-fire and all breech-loading guns—nitroglycerin.
  (2) Swedish apirite, being tested for the purpose of superseding dynamite—nitroglycerin.
  (3) Different kinds of black, brown, prismatic, and other powder from government factories, and a few from Rottweil.

"5. Russia:
  (1) Pyrocollodion powder for 4.7-centimeter (1.85-inch) rapid-fire guns, 30.4-centimeter (12-inch) guns, and light fieldpieces (by way of experiment; resembles the French 'B. N.'). It is used also in the navy for 30.4, 25, 12, 7.5, and 4.7 centimeters (12, 9.85, 4.75, 3, and 1.85 inch) guns—nitrocellulose."

The notes below are taken from various sources, including *Smokeless Powders, etc.*, by Lieutenant Bernadon, U. S. N., and *Nitro-explosives*, by Sanford.

The following smokeless powders are adopted and officially used by various governments:

Cordite consists of gun cotton, 37 per cent; nitroglycerin, 58 per cent; and vaseline, 5 per cent. The gun cotton used is not soluble in nitroglycerin and acetone is added. The various ingredients are formed into a homogeneous mass, which by specially designed presses is squirted into threads or cords. The cords thus obtained are wound on a metal drum. Three of these threads are then wound on one drum, and finally six strands are afterwards reeled on a single drum. This is done in order to obtain a uniform blending of the material. With cordite of a larger diameter, the cord is at once cut into lengths of 12 inches. The drums are then taken to the drying house, where the cordite is subjected to a temperature of 100° F. for three to nine days, in order to evaporate off the solvent. Cordite has been used by England since 1889. It is used by Austria-Hungary.

Ballistite is now used in Norway, in Sweden, and in Italy. It originally consisted of a camphorated blasting gelatin, and was made of 10 parts of camphor in 100 parts of nitroglycerin, to which 200 parts of benzol were then added and 50 parts of (soluble) nitrocellulose were steeped in this mixture, which was subsequently heated to evaporate off the benzol, and the resulting compound afterwards passed between steam-heated rollers, and formed into sheets which were finally cut up into small squares or other shape, as convenient. The camphor contained in this substance was, however, found to be a disadvantage, and its use was discontinued. The composition is now 50 per cent of soluble nitrocellulose and 50 per cent of nitroglycerin. As nitroglycerin will not dissolve its own weight of even the soluble variety of nitrocellulose, benzol is used as a solvent, but is afterwards removed from the finished product, just as the acetone is removed from cordite. The color of ballistite is darkish brown. Ballistite burns in layers when ignited, and emits sparks. The size of the cubes into which it is cut is 0.2 inches. It is also, by means of a special machine, prepared in the form of sheets which are afterwards put through a cutting machine and granulated. In Italy the ballistite is prepared in flakes. A modification—filite—in the form of cords, instead of cubes, is used with the modified field guns. Solenite is very similar to ballistite; in it the percentage of nitroglycerin is reduced.

Pyrocollodion, the powder used by Russia, was developed by Prof. Mendeleyef, and is made from a homogeneous nitrocellulose of 12.44 per cent nitration. Some chemists do not admit the claim that it is a single form of nitrocellulose. For heavy guns it is prepared in various thick strips which in a cartridge are united in one bundle. The powder seems to give uniform and very satisfactory results. Ethyl alcohol is supposed to be the solvent used. According to Mendeleyef's formula for pyrocollodion it gives, on explosion, the maximum ballistic results possible.

B. N. powder, used in France, consists of 38.67 parts insoluble and 33.23 parts soluble nitrocellulose (pyroxylin), 18.74 parts barium nitrate, 4.54 parts potassium nitrate, 3.65 parts calcium carbonate, 1.29 volatile (100.12). It gives a feeble report and a very little bluish smoke, which soon dissipates.

Powder B., used in some of the larger naval guns in France, consists of 2 parts of insoluble and 1 part soluble nitrocellulose. A little vaseline is added. Ethyl alcohol is the solvent.

This was the first pure nitrocellulose powder, that is, without any nitroglycerin or accelerating nitrates.

Troisdorf powder is a mixture of nitrocelluloses of about 12 per cent mean nitration, which is gelatinized by ether alcohol, rolled into sheets, and cut into grains.

Among the smokeless powders that have been used experimentally are the following:

Schultze powder, the invention of Major Schultze of the Prussian artillery, as first introduced, consisted of gunpowder minus sulphur; i. e., it was wood cellulose saturated with the solution of potassium nitrate. The composition has now, however, become more complicated. The late Colonel Cundill gives the following as composition of a sample of Schultze powder: Soluble nitrolignin, 14.83 per cent; insoluble nitrolignin, 23.36 per cent; unconverted lignin, 13.14 per cent; nitrates of potassium and barium, 32.35 per cent; paraffin, 3.65 per cent; substances soluble in alcohol, 0.11 per cent; moisture, 2.56 per cent. Other substances that have, however, been used in its composition are starch, collodion, and paraffin. The wood is first sawed into sheets about $\frac{1}{16}$-inch thick, and then passed through a machine which cuts it up into grains of uniform size. The grains are deprived of the resinous substances contained in the wood by boiling in a solution of caustic soda. They are then drained, steamed, and bleached by chlorid of lime. The grains are now pure cellulose and are nitrated much in the same way as in the manufacture of nitrocellulose. The nitrocellulose or nitrolignin thus produced is then steeped in a solution of potassium nitrate.

E. C. powder is made from a fine form of cellulose derived from good cotton freed from all foreign substances and nitrated. The nitrocellulose formed consists, it is claimed, entirely of the lower nitrates, and gun cotton is said to be entirely absent. The process of manufacture is somewhat as follows: Pure nitrocotton in the form of a fine powder, sprinkled with water, is rotated in a drum, until the cotton has assumed the form of grains. The grains are then dried and moistened with ether alcohol, whereby the surface is gelatinized, and afterward colored with aurin, which gives the orange color. They are then dried and put through a sieve, in order to separate the grains which may have stuck together during the gelatinizing process.

The No. 2 E. C. powder contains a little camphor and is further treated throughout the graining with ether alcohol. A harder grain is thus produced. The stability of the E. C. powder is very satisfactory. Powder No. 2, which is very hard and dense, produces a higher velocity than No. 1, without any increase of pressure in the chamber of the gun.

The E. C. powders are used chiefly in sporting guns.

Rifleite is made from nitrogenized wood dissolved in nitrobenzol. The grains are very small; the powder is of the color of ashes.

BURSTING CHARGES.—"Most of the bursting charges for shells are based on picric acid. [A small amount of smoke-producing explosive is usually added, to locate point of burst.] Picric acid is properly called trinitrophenol, being obtained by nitration of phenol. Pure picric acid is chemically stable, soluble in water, unaffected by ordinary changes of temperature, and not dangerous in preparation and handling. When lighted the picric acid burns slowly with a strongly sooty flame. By a small quantity of detonating fulminate of mercury the picric acid is made to explode, and yields then a bursting energy surpassing that of the same volume of gun cotton and approaching almost that of nitroglycerin. The picric acid, after having been first melted, then powdered and pressed, is proof in the highest degree against blows and percussions, whereby it adapts itself well for bursting charges. The picric acid prepared thus by melting is called in Germany granatfüllung 88 [shell charge '88], in France cresylite or melinite, in Austria-Hungary ecrasite, in England lyddite. That the qualities, nevertheless, are not quite the same, is demonstrated by the English lyddite (called so after the factory in Lydd) which has been the object of so much discussion in connection with the Transvaalese war. According to trustworthy reports lyddite manifests its full energy only when employed with large projectiles, namely, those of calibers 23.4 and 25.4 centimeter. In the 12.7-centimeter howitzer and the 12-centimeter gun, lyddite gave unsatisfactory results. Of every four projectiles only one detonates; the others do explode, but are not 'brisant' in their action. A good detonation is considerably more powerful than an ordinary explosion. When striking against stone walls or stones lyddite shells manifest a good destructive action, but on soft ground or on freshly made intrenchments the damage occasioned is often insignificant."—*Von Löbell.*

New Explosives.—Experiments are still being carried on with picric-acid powders and chlorate mixtures, with as yet no very promising results.

Two new explosives have attracted attention during the year:

According to the information received from the Patent Bureau in Zurich, Joseph Führer has patented an explosive with an admixture of aluminum, this admixture giving great increase of energy to the explosive, an increase of temperature taking place at the moment of explosion. It is stated that this explosive will probably not be adopted for general use on account of its great cost, but that it will be of great importance in some special cases.—*Revue Militaire Suisse.*

A new explosive, Nodal, which is safe from detonation, has been invented by Mr. Fiedler, of Moscow, Russia. His explosive comprises a liquid and a solid, and the two have to be mixed before they will explode. The former is composed of nitrobenzol 80 parts and turpentine 20 parts. The solid consists of potassium chlorate 70 parts and potassium permanganate 30 parts. To form the explosive 20 parts of the liquid are added to 80 parts of the solid. The former is packed in the soldered tins and the latter in packets waterproofed with chromic glue. It is said that if this explosive even when mixed should become ignited by contact with flame, the substance will burn away quietly.—*Arms and Explosives.*

VIII.—AMMUNITION SUPPLY.*

[Compiled by Capt E. A. Edwards, Twenty-Fifth Infantry.]

AUSTRIA-HUNGARY.

SMALL ARMS.

Number of rounds per—	On soldier.	In company ammunition wagons.	Divisional ammunition park.	Corps ammunition park.	Field ammunition depot.	Total.
Rifle	100	42	57	26	25	250
Carbine	50	------------	9	26	25	110

Thirty rounds of revolver ammunition carried on the person are provided for officers and men armed with that weapon.

The infantry rifle is a Mannlicher repeating rifle, model 1895, caliber 8 millimeters (0.315 inch); the carbine is of the same model and caliber, and uses the same ammunition.

The magazine holds five cartridges; it is loaded in one operation by inserting metal clips, or chargers, holding that number. Two of these clips are contained in a pasteboard box.

The company ammunition wagon carries 9,450 cartridges in seven cases; it is provided with eight carrying bags, and is distinguished in the daytime by a red flag and at night by a green lantern.

---

*Books Consulted.—"Hand Books" of Austrian, French, German, Italian, and Russian armies, published by intelligence division, English army; War Establishments—English (official), 1898; Field Artillery Drill, 1896 (English); Infantry Drill, 1896 (English); Modern European Tactics, Balck, Vol. 1, translated by L. R. Maxwell, London, 1899; Organisation de l'armée Austro-Hongroise, Debains, Paris, 1900; Field Service Regulations of the German Army, 1900; Militär-Lexikon, Frobenius, Berlin, 1901; Die Heere und Flotten der Gegenwart, Berlin, 1898–1900; La celerita di tiro e il munizionamento della fanteria, Cascino, Modena, 1899; L'Armée Russe, Bujac, Paris, 1894; Aide-mémoire de l'officier d'infanterie en campagne, Paris, 1897; Aide-mémoire de l'officier d'état-major en campagne, Paris, 1901; Trattato di tattico, Teodoro De Cumis, Rome, 1898; Il tiro, gli esplosivi e le armi, della fanteria, Cascino, Bologna, 1901, etc.

FIELD GUNS.

Rounds per gun.	Field artillery.	Horse artillery.	Mountain batteries.
With battery in limbers and wagon	124	118	112
Divisional ammunition park	110	106	100
Corps ammunition park	35	35	----------
Field ammunition depot	150	130	150
Total	419	389	362

A complete change in the system of field guns is intended, pending which the field and horse artillery are armed with B. L. steel-bronze guns, caliber 87 millimeters (3.42 inches) of the model adopted in 1875, but with recent modifications which make the service of the piece easier, prevent premature discharges, and give greater rapidity of fire. The adoption (1896) of a new and more powerful shrapnel has led to the discontinuance of the use of case shot. The mountain batteries have B. L. guns, caliber 66 millimeters (2.6 inches) and some 87-millimeter guns on narrow-gage carriages, track 45 inches.

INFANTRY.

In camp and on the march men carry 100 rounds, combatant noncommissioned officers 40 rounds; when an engagement is expected each soldier and noncommissioned officer receives from the company ammunition carts enough to bring the number up to 120 rounds. This added weight is about 1½ pounds for the soldier and 6 pounds for the noncommissioned officer.

At the commencement of the action the carts of the battalion move together, keeping under cover as much as possible. They follow the battalion reserve, and when that joins the firing line, the regimental reserve. When under fire, an interval of 20 paces is preserved between the carts. The battalion adjutant or a senior noncommissioned officer may be placed in charge as directed by the battalion commander.

Until within about 800 yards of the enemy it will generally be practicable to supply ammunition from the carts, but at closer ranges this would be extremely difficult and the supply will then be brought up to the line by the reserves ordered to reinforce it, or by small parties under noncommissioned officers sent from the reserve, who after distributing the ammunition remain in the firing line. The companies take advantage of pauses in the fighting to replenish their supplies, to equalize the number of rounds carried by each man, and to recover and distribute ammunition from the dead and wounded. The firing line must always be kept well supplied; if necessary and none other be available, it will be furnished from the ammunition of the reserve troops.

Empty carts are refilled from the divisional park, and return at once to the troops.

On the defensive, especially when occupying prepared positions or fortified places, the ammunition wagons may be emptied before the fight, and the cartridges distributed to the troops or placed in readiness at convenient points near the firing line, after which the supply will be maintained as in the offensive. Any unit requiring ammunition will be supplied fully or partly depending on the emergency and the available supply.

ARTILLERY.

When in action, gun limbers and teams remain near the guns, under cover if possible, the first line of ammunition wagons takes position at from 100 to 200 paces from the guns, the second line is from 400 to 500 paces in rear of the first.

The ammunition in the limbers is first used; when running low it is replenished from the first line by bringing up two wagons at a time; these when emptied are replaced by full wagons from the second line, and when several have been emptied they are sent together to the divisional or corps ammunition park to be refilled.

AMMUNITION PARKS.

In war time the divisional ammunition park has separate columns for infantry and artillery ammunition and carries also a small reserve supply of artillery material. With it are a few artillery reserve men and horses. It is replenished direct from the corps park. Parks for infantry divisions equipped for mountain warfare are organized in three sections, one for each of its infantry brigades. Its personnel is made up of detachments from the mountain batteries and technical artillery, the strength depending on the means of transport to be used—pack or wagon; if the latter, whether supplied from the train or requisitioned from the country.

Cavalry division ammunition columns correspond to the infantry divisional parks. They carry about 100 rounds per gun of the horse artillery and 20 rounds per carbine and revolver.

Corps ammunition parks consist of one infantry and two artillery ammunition columns. Explosives for engineer purposes, spare parts and material for repair of artillery, are also carried. The small-arm ammunition carried includes a reserve for carbines and revolvers. The corps parks are supplied from army field depots specially organized to meet the requirements of the particular field of operations. One of these depots may supply the needs of two armies. The supplies are in storehouses, and an established arsenal may be used for the purpose, if conveniently located. It has no wagon transportation of its own, and the amount of reserve ammunition to be kept on hand is as follows:

26 rounds for each rifle or carbine in infantry and cavalry.
15 rounds for men of artillery trains and pioneer corps.
150 rounds per gun for field artillery.
130 rounds per gun for horse artillery.

Large repair shops are also established, and material, spare parts, etc., provided to meet emergencies.

Ammunition parks are marked in daytime by red and blue flags and at night by green lanterns.

FRANCE.

SMALL-ARM AMMUNITION.

Number of rounds for—	On the soldier.	Company ammunition carts.	Divisional ammunition column.	Corps ammunition park.	Total.
Infantry, rifle	120	65.5	69	48.5	303
Cavalry, carbine	48				

The infantry is armed with the Lebel repeating rifle, model 1886–1893, caliber 8 millimeters (0.315 inch). The magazine holds 8 cartridges. Ammunition for the rifle is in packets of 8 rounds, united in bundles of 8 packets; 30 bundles are packed in wooden zinc-lined boxes; weight filled, 154 pounds.

The company ammunition wagon carries two chests, each holding 128 bundles, total 16,384 rounds. Twelve sacks for distributing the cartridges are in each chest and the wagon has also a prescribed number of intrenching tools—spades, picks, etc.

A box of ammunition, 1,920 rounds, is carried on each of the four regimental baggage wagons, as a reserve for the men guarding the train.

The infantry ammunition wagon of the division column carries 26,496 rifle cartridges or 33,858 revolver cartridges.

The carbine, of the same caliber as the rifle, is of three patterns, differing but slightly from each other. Ammunition is in clips of 3 rounds, 2 clips are packed in pasteboard boxes, six of which make a bundle. In each of three sections of the infantry ammunition column, 19,872 rounds of carbine cartridges are carried for all men armed therewith. This, besides the cavalry, includes noncommissioned officers and certain men of artillery, men of the engineer and technical troops, with trains, etc. Men armed with the carbine, not in the cavalry, usually carry with them 36 rounds. In an independent cavalry division, one wagon in each battery carries carbine and revolver ammunition.

Two patterns of revolvers are in use; the 1874 model, caliber 11 millimeters (0.433 inch), for the rank and file, and model 1892, caliber 8 millimeters (0.315 inch), for officers. Officers and men armed with the revolver carry 18 rounds; a reserve supply of 12 rounds is carried in the infantry ammunition column.

Revolver cartridges of both calibers are in packs of 6; three of these are combined in larger packets. In each section of the infantry ammunition column 4,356 rounds are carried.

FIELD GUNS.

The field artillery and horse artillery are armed with the new 75-millimeter (2.95-inch) nickel-steel quick-firing gun. Details of the new gun, or number and description of projectiles to be provided, have not been published officially. From other sources it is learned that batteries will be of 4 guns with 9 wagons, and 6 guns with 12 wagons. Ammunition carried is as follows: In gun limber 24 rounds, in wagon limber 24, rear body 48. This in a four-gun battery (9 wagons) gives a total of 744 rounds, 186 per gun, and in the six-gun battery (12 wagons) 1,008 rounds, 168 per gun. The proportion of shell and shrapnel is not stated. No case is carried.*

---

*The France Militaire states that the number of ammunition wagons which accompany a battery of 4 of the new 75-millimeter (2.95-inch) guns has been increased from 11 to 12, against the 9 wagons which used to accompany the old batteries of 6 guns. The new gun, however, has been found too heavy for the horse artillery, its weight with carriage and limber being 37.4 hundredweight. It has, therefore, been decided that no ammunition shall be carried on the carriage of the gun used by the horse artillery. This will reduce the weight by nearly 4 hundredweight. At the same time the number of wagons accompanying each gun in this case will be reduced from 3 to 2, it being considered that artillery operations with cavalry will be much shorter than those with infantry.—*Journal of the Royal United Service Institution, December, 1901.*

This amount may be compared with that carried in batteries of guns of former pattern, viz:

	Rounds.
Field battery, 90-millimeter	142
Horse artillery of corps artillery, 80-millimeter	156
Horse artillery of cavalry divisions, 80-millimeter	142

Reserve ammunition carried in the divisional ammunition column, and in the corps ammunition park, was for the field artillery and horse artillery of the corps, about 120 rounds for the 90-millimeter and 130 rounds for the 80-millimeter gun.

The artillery of the cavalry divisions replenish their wagons from the nearest column or park. With the new gun a larger number of rounds may be carried, or the number of wagons of the column reduced.

GENERAL RULES.

The supply of ammunition is of such capital importance that commanders of every rank must exercise the greatest vigilance to insure the timely replacement of all ammunition expended. In action this is effected from the rear, the units there being required to keep up communication with those in front.

INFANTRY.

The company ammunition wagons of a regiment of infantry are under the direction of a noncommissioned officer, the four wagons of each battalion being grouped under another noncommissioned officer, assisted by two men from each company. When the battalion is divided, as in advance or rear guard, the wagons remain together with the battalion reserve. When a company is detached it may or may not be accompanied by its own wagon, according to circumstances.

In quarters or on the march individual deficiencies in ammunition are made up from cartridges taken from men sick, absent, etc., before recourse is had to the company wagon, which must promptly replace its complement from the ammunition column.

Before an action the contents of the wagons are distributed to the men. If for any reason this can not be done, the wagons in groups of four follow their battalions, and the commander makes arrangements for the subsequent distribution. Company carts are not refilled during the action; when emptied they are replaced by full wagons from the ammunition column on the order of the division commander, or in default of such order, the commander of the section of the ammunition column will send them forward whenever he is informed by the commander of a unit that his wagons are empty. Cartridges are also collected from the dead and wounded and distributed.

Wagons from the ammunition column proceed to where the company wagons of the battalion are grouped, and from there may go to the firing line or its immediate vicinity, as may be ordered. Every pause in the action or lull in the firing is taken advantage of to distribute ammunition.

During the fighting no men or wagons are to go to the rear to replenish ammunition. This applies not only to troops engaged, but to company-wagon groups, and wagons of the ammunition column. Generals of brigades or divisions may direct company wagons to supply any unit of the brigade or division. After doing so they return to their own regiment. In the absence of such orders, ammunition will only be furnished to other troops by permission of the battalion or regimental commander, but sections of the ammunition column must supply any organization needing it, whether of their own division or not.

After a battle the company wagons are refilled from the ammunition column. If men have more than their allowance, the excess is taken from them and replaced in the company wagons.

The columns are in turn replenished from the corps park. While in general this is done after the fighting is over, the corps park may be called upon during the action if necessary or be required to furnish ammunition directly to the batteries engaged.

ARTILLERY.

In battle the firing line is made up of the 6 guns and three of the wagons of each battery, the latter about 16 yards in rear of the guns, the gun limbers 10 yards in rear of the wagons, or they may, if necessary, be put under available cover, either in rear or on the flank, about 150 to 250 meters from the guns; the wagon limbers may be placed with the gun limbers. The remainder of the wagons, spare men and horses, etc., take post between 500 and 600 yards in rear of the battery. One of the artillery sections of the ammunition column is pushed forward to within about 1,600 yards of the line of batteries.

Ammunition is replenished by sending full wagons from the second line of the battery to replace empty ones on the firing line; these are in turn refilled from the wagons of the ammunition column. In urgent cases, to be decided by commanding generals, an exchange of wagons may be made.

The divisional columns are replenished from the corps park.

The grand park of the army is composed of divisions for each of the corps, and supplementary divisions for special guns when required. It has also a reserve of spare wagons, material for repair, etc. Each division of the grand park is further divided into 5 sections of identical composition. The first section has with it wheeled transportation sufficient to carry the whole supply of a section. That amounts to about 22 rounds per rifle, 27 rounds for each gun of the horse artillery, and 20 rounds for field artillery guns, the whole weighing, with the cases, nearly 75 tons.

GERMANY.

SMALL ARMS.

Number of rounds.	On soldier.	Company ammunition wagons.	Infantry ammunition column.	Cavalry ammunition column.	Ammunition park.	Total.
Infantry	120	57.6	100	----------	20	297.6
Cavalry:						
Carbine	50	----------	----------	60	----------	110.0
Pistol	18	----------	----------	18	----------	36.0

In an emergency 10 additional rounds of rifle ammunition may be carried in the company ammunition wagons by substituting ammunition for forage.

A small reserve of carbine and revolver ammunition is carried in the infantry ammunition column.

The 1888 pattern rifle is still the service arm, but is being gradually replaced by the 1898 pattern. The former is a magazine rifle of the Mannlicher type, caliber .309, and can not be used as a single-loader. The 1898 pattern is on the Mauser system, of the same caliber, and takes the same ammunition. By an improved method of loading, single cartridges can be inserted at any time, and no cut-off is necessary. The cartridges are arranged in the magazine in two vertical rows, one of 3 and one of 2 rounds, close against each other, so that the magazine is much smaller and entirely in the stock. The sighting is also improved.

The carbine is of the 1888 pattern and takes the same cartridge.

Two patterns of revolver are in use. In Prussia, Wurttemberg, and Bavaria a 6-shooter, caliber 4.7, weighing nearly 3 pounds, is used. The Saxon revolver is 5-barreled, modeled on Sharp's system, caliber .433, and weighs 2¼ pounds.

Rifle and carbine cartridges are in clips of 5, three of these form a packet, 15 packets (225 rounds) are in bundles weighing 16.97 pounds, provided with carrying loops, and five of these bundles are packed in ammunition boxes. The contents of an ammunition box can be distributed by two men, one carrying three and the other two bundles.

Each company ammunition wagon carries 64 bundles (14,400 rounds), weighing 1,086.08 pounds.

FIELD GUNS.

Number of rounds for—	With battery.		In light ammunition column.		In heavy ammunition column.		Total.
	Shrapnel.	High-explosive shell.	Shrapnel.	High-explosive shell.	Shrapnel.	High-explosive shell.	
Field gun	124	6	29⅛	22	128	26	181⅛
Field howitzer	54	32	10	58	13	58	212

The light ammunition column of a cavalry division carries 44 shrapnel and 22 high-explosive shells per gun, the supply in the horse artillery being larger, on account of the greater difficulty of replenishing from the heavy ammunition column.

Both field artillery and horse artillery are armed with the 7.7-centimeter (3.03-inch) quick-firing nickel-steel gun. When the reorganization of the field artillery, now in progress, is completed, one-eighth of the force (not including the horse batteries of the cavalry divisions) will be armed with the new 10.5-centimeter (4.14-inch) field howitzer.

INFANTRY.

Leaders of every grade are responsible for the proper expenditure of ammunition and its timely replacement. Every effort must be made to keep up the supply to troops in action. When a fight is expected, the ammunition columns, infantry, and artillery, will be brought up as close as possible, and subordinate commanders notified of their location and time of arrival. Ammunition columns must supply ammunition to any person apparently authorized to demand it.

On the march the company ammunition wagons of each battalion are together for convenience of supervision and control. A company acting alone, or with the advance guard, is accompanied by its own wagon. Before an action the contents of the small-arm ammunition wagons are to be wholly or partially distributed to the men, who carry the cartridges in haversacks, trousers and coat pockets, etc. The empty wagons are refilled from the ammunition column and immediately endeavor to regain touch with their organizations. They should supply ammunition to any unit that needs it. The wagons should take a position under cover as near as possible to the troops, in pressing cases without regard to losses.

Troops on the firing line are, if possible, to be supplied with ammunition by every reinforcement. If men are sent specially to take ammunition they should be from troops in rear not yet engaged. Ammunition should be taken from the dead and wounded, but the advance must not be delayed for the purpose. Officers and men must replenish their ammunition at every opportunity without special orders, and should always have with them not only their full allowance, but as much more as they can possibly procure.

In a defensive action in a prepared position, ammunition should be deposited in boxes or other receptacles on the firing line. Of cartridges carried by the soldier, those in the haversacks and pockets should be first used, the supply in the right-hand pouch being reserved for the decisive moment when rapid fire is of great importance. In replenishing, the right pouch is first filled, then the left pouch; remaining cartridges are carried in haversacks or pockets.

The battalion commander is responsible for the refilling of the wagons of his battalion from the ammunition column, until the arrival of which regimental and battalion commanders should, in case of need, secure a reserve from the wagons of the troops in rear. It is also recommended that additional ammunition wagons from those belonging to troops in reserve be assigned to organizations that are likely to need an increased number of cartridges.

Cavalry divisions have special cavalry ammunition wagons attached to their artillery light ammunition columns.

During an action, foot artillery, pioneers, or telegraph troops who need small-arm ammunition must procure it from the nearest infantry wagons, after an action, from the nearest infantry ammunition column.

FIELD ARTILLERY AND HORSE ARTILLERY.

Artillery commanders must arrange for the continuous supply of ammunition to their positions, and all concerned in the replacement of ammunition must exert themselves to the utmost to provide a supply for the firing line without special orders or suggestions.

In action, ammunition will be taken from the limbers, until the wagons have come up behind the guns. Wagons, as a rule, will be unlimbered, and their limbers, as soon as emptied, will be placed under cover with the gun limbers. The second line of wagons will take position about 300 meters in rear of the guns, if possible under cover, but constant communication with the batteries is the first consideration.

Before the battery ammunition is exhausted the leader of the second line will bring up his wagons. After the wagon bodies have been exchanged and the limbers emptied, they will return to their position.

Light ammunition columns are under the orders of the division commander, who will direct their movements. They may at the beginning of an action transfer the control to the commanders of the artillery brigades. The division of a column into two shrapnel sections and one shell section, each of three subsections, corresponds to the formation of a regiment. Without being restrictive, every endeavor should be made to supply regiments from the columns bearing the same numbers, but the controlling rule for the sending forward of ammunition is the actual requirement at the time. Usually the wagons needed will be sent to the second line of the battery, and the empty wagons of the latter brought back. A transfer of the contents of the wagons would be possible only during a lull in the action. Under certain conditions the wagons of the column may be sent direct to the batteries; with the shell sections this will be the rule.

Emptied columns withdraw out of range. Connection between the light and heavy columns must be reestablished as soon as possible. The replenishment of the light column will, if possible, be by transfer of loads on the field itself. Where haste is desirable the heavy columns, or part of them, may go direct to the batteries. After an action the batteries will usually be supplied direct from the heavy columns.

Heavy ammunition columns replenish from the field ammunition park at the base, or from advanced depots on the line of communications. The field ammunition park is supplied from the central ammunition depots usually located in frontier fortresses, which are in turn supplied from the artillery depots in Germany.

The infantry ammunition column of a division consists of 23 small-arm ammunition wagons, each carrying 27,000 rounds, providing about 100 rounds per rifle. A small reserve of revolver and carbine ammunition for cavalry is also carried. A field forge and 2 battery store wagons are attached to the column. The wagons are painted gray.

The light ammunition column for artillery has 21 wagons; 12 of these carry shrapnel, and 9 are for shell. The light column for horse artillery of a cavalry division has 9 wagons, 6 shrapnel and 3 shell.

The heavy ammunition column numbers 23 ammunition six-horse wagons, 1 field forge, six-horse, and 2 battery store wagons, four-horse.

GREAT BRITAIN.

SMALL ARMS.

Rounds.	On soldier.	Small-arm ammunition carts.	Ammunition column.	Ammunition park.	Total.
Each rifle or carbine, caliber 0.303 inch:					
Infantry	100	77	77	55	309
Mounted infantry	100	130	56	76	362
Cavalry	30	21	25	3	79
Artillery, field and horse	20	----------	20	20	60
	On gun carriage.				
Each machine gun, caliber 0.303 inch, with—					
Infantry	4,000	6,600	8,800	9,000	28,400
Mounted infantry	3,500	17,600	13,200	11,000	45,300
Cavalry					

Men of the engineer troops (bridge, railway, telegraph, etc.) carry 50 rounds and have 50 to 80 rounds in regimental wagons. Men of army service corps, and with ammunition columns and parks, carry 20 rounds and have about the same number in reserve.

For each Webley pistol 36 rounds are provided, 12 carried on the person, the remainder in the battalion or regimental reserve and in the ammunition column.

Sixteen boxes, each containing 1,100 rounds, are carried in the small-arm ammunition cart. Two boxes are a load for a pack mule.

FIELD GUNS.

	With battery.	Ammunition column.	Ammunition park.	Total.
Cavalry brigade batteries, 12-pounder:				
Shrapnel	134	95	59	288
Shell	8	4	3	15
Horse batteries, 12-pounder:				
Shrapnel	134	71	84	289
Shell	8	3	4	15
Field batteries, 15-pounder:				
Shrapnel	142	74	73	289
Shell	8	4	4	16

INFANTRY.

Commanding officers of battalions are responsible for the ammunition in battalion charge. Officers commanding royal artillery are responsible to general officers commanding for that in the ammunition columns and ammunition parks under their respective commands.

The position of the divisional ammunition columns and ammunition parks on the line of march is settled by general officers commanding divisions and army corps.

Each brigadier will select an officer to command the brigade ammunition reserve, formed from the battalion ammunition carts.

On the march two small-arm ammunition carts and two mules will follow immediately in rear of each battalion; the remainder of the small-arm ammunition carts, two per battalion (total, eight in a 4-battalion brigade), will be brigaded and will follow in rear of the brigade, under command of the officer mentioned above.

In action one small-arm ammunition cart and one mule will follow each half battalion—the mule in rear of the supports, the cart in rear of the reserve; the brigade ammunition reserve will follow in rear of the center of the brigade.

On difficult ground, and to meet varying conditions, officers commanding battalions and brigades will give special directions as to their ammunition carts.

Brigadiers, officers commanding battalions, and the officer commanding the brigade ammunition reserve must keep themselves informed of each others' position.

When a cart with the battalion is emptied it will be sent back to the brigade ammunition reserve and will be replaced by a full cart; when there are four (three in a 3-battalion brigade) empty small-arm ammunition carts with the brigade ammunition reserve they will be replaced from the divisional ammunition column.

The officer in charge of a brigade ammunition reserve of infantry or in command of battery wagons will, as soon as possible, open up communication with the ammunition column, and will take the earliest opportunity to get full carts or wagons from the column to replace empty ones. The brigade ammunition reserve should not be regarded as belonging to any particular corps, but be available for the brigade generally.

Empty carts are to stay with the brigade ammunition reserve as they advance until they are replaced by full ones.

CARRIERS.—The captain of every company will detail 1 noncommissioned officer and 2 privates to act when required as ammunition carriers (if the company be strong, 3 privates should be detailed). Only men of strength and activity should be selected for this duty, the importance of which can not be overrated. Whenever a general action is anticipated commanding officers will issue to the men 50 rounds from the small-arm ammunition carts, so that, if possible, every man shall carry 150 rounds on his person.

If, for any reason, these carts are not at hand, the companies of the first line will be furnished with two extra packets per man from the other companies. This will be replaced as soon as possible from the battalion carts.

During an action every opportunity will be taken for keeping up the supply of ammunition of the firing line by sending some up by carriers or with reenforcements. These carriers bring the ammunition from the mules (or from the carts) in bags, and distribute it to the men in the ranks. The bags, which are specially made for the purpose, form part of the equipment of the ammunition cart. The loads are not to exceed 600 rounds to each carrier, and, when advisable, the carriers will be led up to the troops in action by a selected noncommissioned officer.

When more ammunition is required by the firing line it will be taken forward by any men at hand from the main body, acting as carriers.

The carriers will move direct to the companies for which they are destined, and will remain in their ranks until the action is over.

Supernumeraries must make sure that all ammunition from the killed and wounded is collected and distributed to the firing line, its supports and reserves.

The system of carrying ammunition by hand, here provided for, is not to prevent every endeavor being made to push the ammunition carts as far forward as practicable. They ought, in ordinary circumstances, to get within 1,000 yards of the firing line, and on broken and undulating ground considerably nearer. With pack animals, it should be practicable to get within 500 yards of the firing line.

The immense importance of having a supply of ammunition out of sight of the enemy, and yet within easy reach of the firing line, will justify great risks being incurred in getting it to such a position.

ARTILLERY.

As a rule, the supply of ammunition to guns in action will be first from the wagons, but when likely to remain but a short time in position, and always in horse artillery acting with cavalry, the supply will be from the limbers.

The supply from ammunition wagons is not to be restricted to their own batteries.

Each ammunition column is under the orders of the officer commanding the artillery of the division or other troops which it supplies. On the eve of, or during an action, it must be pushed forward to a favorable position within about a mile of the line of guns, ascertaining while on the march the whereabouts and wants of the troops it has to supply. When full wagons or carts are sent forward the horses belonging to the column bring back the empty ones to be refilled.

The commander of the column is responsible for the due supply of ammunition. Requisitions are not necessary; receipts prepared by the issuing officer and signed by the receiving officer for the number of full wagons or carts furnished are all the vouchers required. The supply is not to be restricted to the troops of its own division. During an action any troops demanding ammunition must be supplied.

The foregoing rules are of general application.

A further reserve is provided for by the ammunition park. The park of an army corps is divided into four sections, one for each infantry division, and one for the corps troops. If a cavalry division is attached to the army corps a fifth section is added. The park will usually be a day's march in rear of the ammunition column. During an action it will be posted at some convenient point in rear, off the roads, and its location made known at once to the army corps artillery commander, and to the ammunition-column commanders. The park will supply all ammunition which the ammunition column can not furnish, in addition to filling up the latter. After an action all wagons will be returned at once to the various batteries or columns to which they belong.

ITALY.

SMALL ARMS.

The war allowance for small-arm ammunition is as follows:

Infantry of the line.

	Rounds.
Carried by the soldier (9 packages)	162
In regimental ammunition wagons	23
In divisional ammunition parks	41
In corps parks	62
In army park	25
In the central depot	87
Total	400

Alpine regiments.

Carried by the soldier	162
Carried on pack train	52
Carried in ammunition carts	106
Carried in ammunition parks	84
Total	404

Cavalry.

Carried by the soldier	60
Carried by the several parks	190
Total	250

The Italian line infantry, rifle regiments (bersaglieri), and Alpine regiments, are armed with a magazine rifle (Mannlicher-Carcano, model 1891) caliber 6.5 millimeters (0.256 inch). The cartridges are in packets of 6, convenient for loading the magazine. The total weight of gun, bayonet, and ammunition carried by the soldier is about 17.74 pounds. The cavalry is armed with a carbine of the same model and caliber.

As a rule, the ammunition in the regimental wagons is distributed as required during the progress of the action, so as to keep the reserve intact as long as possible. When exhausted the knapsacks in which the cartridges are packed for distribution are refilled from the division ammunition column at the first opportunity.

FIELD ARTILLERY.

Round per gun of—	With battery.	Division ammunition column.	Cavalry division ammunition column.	Army corps park.	Total.
Heavy field artillery, 9-centimeter	130	73		99	302
Light field artillery, 7-centimeter	142			160	302
Horse artillery, 7-centimeter	150		56		206

A further supply is held in the army park and the central artillery depot, bringing the number of rounds up to 402 per gun for the field artillery and 407 for the horse artillery.

The guns now in use are of compressed bronze, having the Krupp system of breech mechanism. They are the same for the light field and horse artillery, but with different carriages. The early adoption of a new type of rapid-fire gun to replace the 7-centimeter gun is contemplated. Modifications of the carriage of the 9-centimeter gun and the addition of a new trail brake have increased its rate of fire, and it will be retained for some time. The mountain gun, 7-centimeter, weighs 216 pounds, the carriage 302 pounds.

In action the battery guns are in line, with intervals of 10 to 25 yards, the limbers 10 yards in rear of each gun, the first line of three wagons about a hundred yards in rear of the guns, the second line of three wagons at not more than eight or nine hundred yards and under cover if possible. With several batteries in action they are in line or echeloned with such intervals as may be required by the configuration of the ground, and the wagons of the second echelon are usually massed under an officer selected by the commander of the artillery brigade.

The divisional ammunition column, besides small-arm and artillery ammunition, has two spare 9-centimeter guns, forge, supply of intrenching tools, etc.

The ammunition column of the cavalry division has likewise two spare 7-centimeter guns, intrenching tools, etc.

The corps ammunition park or column is of similar composition to that of the division, but on a larger scale.

RUSSIA.

SMALL ARMS.

Number of rounds of small-arm ammunition.

For rifle.	On soldier.	Small-arm ammunition carts.	Divisional parks.	Local parks.	Total.
Infantry	120	66	73	170	429
Cavalry	40	23	----------	156	219

The Russian infantry is armed with the 3-line (0.30-inch) magazine rifle, 1891 pattern. The magazine holds 5 rounds; it has no cut-off, but may be used as a single-loader when the magazine is empty.

The whole Russian cavalry is armed, in addition to the sword, with a rifle and bayonet, which is the same as that of the infantry except that the barrel being about 3 inches shorter, the gun weighs about ¾ of a pound less. The bayonet is quadrangular in cross section and in the infantry is always carried fixed. The Cossack cavalry has the cavalry rifle, but does not carry the bayonet.

The revolver, caliber 0.30-inch, of seven chambers, is of two patterns, triple action for officers, single action for rank and file. Revolvers are carried in infantry and cavalry by officers, certain noncommissioned officers, and trumpeters; in addition, by 40 men per battery of field artillery and by all ranks in the horse artillery.

Each company has an ammunition cart, one-horse, carrying 6,000 rounds. The regimental ammunition and baggage train is in two echelons. With the first are 8 company ammunition carts, and with the second the remaining 8 company carts and 8 regimental ammunition wagons, two-horse, or 17 carts, one-horse.

On the march the first line of ammunition carts and baggage wagons follow immediately in rear of the units to which they belong. In the second line the ammunition wagons are at the head of the column, the other wagons being arranged in the order of the units. The second line may be from a mile to half a day's march in rear, according to the difficulties of the road and the proximity of the enemy.

Details of the Russian military establishment are difficult to verify. The Handbook published by the British intelligence division says that 6,000 rounds are carried on the company cart in 20 zinc boxes, each containing 300 rounds; other authorities give the load of the company ammunition wagon, model 1893, as 14,000 rounds. It is probable that the 8 regimental wagons are of the 1893 model, and are equivalent to the 17 company carts. Assuming the capacity of the company cart to be 6,000 rounds and that of the regimental wagon as 14,000 rounds, this would give to each company a reserve of 6,000 in its own cart and half the contents (7,000 rounds) of a regimental wagon—total, 13,000 rounds; an average for each rifle of about 60 rounds or, if noncommissioned officers be excluded, about 66 rounds, agreeing with the number given in the table.

In action the company carts of the first line follow the troops as closely as possible, not further to the rear than the regimental reserve, or if cover be available, behind the battalion reserve. They are under charge of an officer, who remains with them and directs their movements, moving them forward or backward as may be necessary. Their position is marked in daytime by a red flag and at night by a green lantern, which should not be visible to the enemy.

On the defensive, if a severe action is expected, a part of the ammunition may be disposed along the firing line, and further supplies brought up during the action.

Before an attack the contents of the ammunition wagons are partially distributed to the men, so as to increase the number of rounds to 150. The expenditure of ammunition must be carefully regulated by the number of rounds carried by the men, and the facilities for replenishing the supply. As in the attack, the replenishment of ammunition at the proper time can not be depended on, the greatest prudence in the expenditure of cartridges must be practiced, particularly at the long ranges.

During the action chiefs of squads and sections must keep informed as to the number of rounds in the hands of the men, and see that those carried by the dead and wounded are collected and distributed. They will make timely demand on the wagons for ammunition needed. When the zone of effective fire is reached (560 meters from the enemy) the troops should still have a full supply of ammunition, because at shorter ranges it will be very difficult to replenish it. When ammunition is required on the firing line, during the action, it will be sent forward from the reserve. The organizations of the reserve designated to furnish cartridges to the firing line, when called on, give up half their supply, which is collected and taken to the front in boxes, baskets, or any convenient receptacle, by small squads under a noncommissioned officer, and there distributed. The reserves renew their supply from the wagons. The carts are emptied in succession and go back to the second line to refill. Company ammunition wagons are required to supply the nearest infantry units, or even cavalry units, if called on to do so.

After the fighting an immediate account of ammunition must be taken, and arrangements made for prompt replenishment.

ARTILLERY.

A new type of rapid-fire gun has been adopted, and it is said that the army will be supplied by the end of 1903 with 1,000 batteries of 6 guns each. At present the field artillery is armed with steel B. L. guns, Krupp system, of different patterns—the heavy field gun, caliber 4.2-inch; the light field gun, caliber 3.42-inch, of which there are two varieties, those constructed since 1892 being somewhat the lighter, with interrupted-screw breechblocks and De Bange obturators. The horse-artillery gun is of the same pattern as that in the light field batteries and takes the same ammunition, but is 16 inches shorter and weighs about 500 pounds less than the latest pattern of light field gun.

Since 1893 the horse-artillery guns have also been constructed with interrupted-screw breech closure and De Bange obturation. They are 83 pounds lighter than the old style. The howitzer artillery has a field howitzer, caliber 6-inch. The mountain guns are arranged for transport on pack animals, have a caliber of 2.5 inches, and weigh 194 pounds. The ammunition for each gun, after deducting the small number of case shot provided, is nearly equally divided between shell and shrapnel The howitzer batteries carry no case shot, and their shells are loaded with high explosives.

The following table shows approximately the allowance of ammunition provided for the active army in the field:

Rounds per gun.	With battery.	Flying artillery parks.	Local parks.	Total.
Heavy field gun, 4.2-inch	108	118	250	476
Light field gun, 3.42-inch	150	104	216	470
Horse-artillery gun, 3.42-inch	130	--------	216	346
Field howitzer, 6-inch	92	130	200	422
Mountain gun, 2.5-inch	96	144	250	490

The tactical unit of the Russian artillery is the brigade division of two or three batteries, numbered the same as the infantry division to which it is attached.

When going into action a battery forms a firing line composed of the guns and one-third of its wagons, the remaining wagons and spare gun carriage of each battery are combined into a divisional wagon echelon under an officer detailed by the division commander, not more than 700 yards in rear. The limbers should not be retired over 200 yards from the guns, and should be under cover if any be available. The "flying park" may be from 2 to 3 miles from the batteries.

Empty wagons on the firing line are exchanged for full ones from the wagon echelon by the battery commander's order. Empty wagons from the echelon are sent back to the park to refill in groups of not less than four wagons at a time. Timely notice of an advance or retirement must be given to the commanders of the wagon echelon and park.

AMMUNITION COLUMNS.

Cadres of "flying parks" maintained in peace are, on mobilization, expanded into "flying-park brigades" of three columns, one for infantry and two for artillery ammunition for each division of the field army. They receive supplies from "mobile parks," field ammunition depots, or local parks.

"Flying parks" are those with the active army; those with the reserve divisions are called "mobile parks." The system of parks for ammunition supply is controlled by the artillery inspector of the army. Cavalry divisions are not accompanied by ammunition columns; they replenish their supplies from the nearest ammunition depot.

The following table shows the weight of gun and ammunition carried by the infantry of different armies:

	Number of rounds carried.	Weight.	Weight of gun and bayonet.	Total weight.	Remarks.
		Pounds.	*Pounds.*	*Pounds.*	
Austria	100	6.24	9.13	15.37	To these weights must be added that of the packages containing the cartridges, from about 8 to 12 ounces.
England	100	6.16	10.22	16.38	
France	120	7.66	10.10	17.76	
Germany	120	7.26	9.17	16.43	
Italy	162	7.84	9.15	16.99	
Russia	120	6.73	9.48	16.21	

CARRIED BY THE SOLDIER.—In Greece, Norway, Sweden, Servia, 100 rounds; Belgium and Denmark, 120 rounds; Roumania, 130 rounds; Spain, Switzerland, Turkey, 150 rounds; Holland, 160 rounds.

IX.—MECHANICAL TRANSPORTATION.

[COMPILED BY SECOND LIEUT. R. S. CLARK, NINTH INFANTRY, AND TAKEN MOSTLY FROM THE REVUE MILITAIRE SUISSE AND THE BERLINER TAGEBLATT.]

During the past year numerous tests have been made by the various European countries to find suitable mechanical traction for military purposes. Traction engines for the transportation of supplies and automobiles for the use of staff officers were used with success in the German, Swiss, and French maneuvers. In the German maneuvers various makes of automobiles were used by the staff officers, and two Thornycroft steam freight wagons, two Fowler traction engines of the Malta pattern, each of which drew three loaded country wagons, and one "Scotte trakteur" of the same pattern as used in the French army, were used for the transportation of supplies.

In the Swiss maneuvers, one Peugeot, one Panhard and Levassor, and one Daimler automobile were used by the staff officers, and two Peugeot freight wagons, one light and one heavy, for the transportation of supplies.

In the French maneuvers the same kinds of mechanical traction were used as during the maneuvers of the year before.

In spite of the uniformly bad condition of the roads and rainy weather during all these maneuvers, all the machines worked well, with the exception of the "Scotte trakteur" used in the German and the light Peugeot freight wagon in the Swiss maneuvers. The traction engines and automobiles were used almost entirely on the roads; when attempts were made to use them off the roads they were not successful on account of the very wet condition of the soil. Although these conditions were as bad as would be likely in European warfare, the tests in the maneuvers were not nearly as severe as those required by the British war office in the recent competitive trials.

In South Africa, traction engines have been used very successfully for the transportation of supplies. In May, 1900, 35 Fowler traction engines were sent to the British army in South Africa, and these have proved very efficient in the transport of supplies, etc. One of these is capable of hauling a 4.7-inch naval gun up an 11 per cent grade. Lord Roberts used them for placing heavy guns in position. Even on sandy soil they behaved well on account of the wide-rimmed tires. At the crossing of the Tugela river one of these engines pulled a cart over the river bed and up the steep bank, a piece of work which 80 oxen could not accomplish. In Buller's army eight traction engines transported 20 tons of provisions 12 miles a day, while 90 horses with 20 carts and a much larger personnel made only 4½ miles a day and consumed 1,980 pounds of forage per day. The water tanks of the traction engines, however, had to be renewed every 5 miles. Col. R. E. B. Crompton, a transport officer in South Africa, states that 130 tons of provisions per week were carried by traction engines to two columns from Pretoria to Rustenburg, a distance of 20 or 30 miles. Of these, 30 tons were rations and 100 tons forage. Had mechanical traction been used by these columns 7 or 8 tons of fuel would have sufficed, instead of 100 tons of forage. Colonel Crompton further states that he has seen a 10-ton gun carried up a gradient of 1 in 5 at the rate of 12 miles an hour.

BRITISH WAR OFFICE TRIALS OF MILITARY SELF-PROPELLED WAGONS.

(The following article was taken mostly from the British weekly Engineering and the illustrations from the Navy and Army Illustrated.)

During the year 1901 the British war office offered three prizes (first prize £500; second prize £250; third prize £100) for "the three self-propelled lorries which shall be adjudged, after a series of trials to be carried out by the war office committee on mechanical transport, to be best suited for mechanical requirements." The following is a copy of the official regulations:

Statement of requirements of self-propelled lorry for military purposes.

1. The lorry to be capable of being used on rough roads and to a limited extent across country; to be able to go wherever a country cart can go, and to be capable of being driven through an opening 7 feet 6 inches wide.

2. Net load to be 5 tons, of which 3 tons must be carried on the lorry itself and 2 tons on the trailer. These weights are exclusive of fuel and water, all of which must be carried on the lorry.

3. Total platform area not to be less than 15 square feet for each ton of net load.

4. The lorry platform and trailer to be fitted with removable sides and ends about 2 feet high.

5. The top of the platform, when the lorry is ready for loading, not to be more than 4 feet 3 inches from the ground level, and that of the trailer not more than 4 feet.

6. The lorry, carrying its full weight of 3 tons and drawing a weight of 2 tons, to be capable—

(1) Of a speed of 8 miles per hour on fairly level roads in fair condition.

(2) Of a mean speed of 5 miles per hour on average roads up and down hill.

(3) Of taking its full load without assistance on an average road, up a slope of 1 in 8.

7. The weights should be so distributed that the lorry should always be under control on slopes of 1 in 8, whether loaded or empty.

8. Proper arrangements to be made that no part of the machinery be liable to damage from mud or dust.

9. Any casings used must be easily removable.

10. In order to avoid damage to the lower portions of the machinery from touching the ground when going over rough country or in event of the wheels sinking into soft ground, all such portions must be strongly protected, and, except in the case of the driving gear, must not be less than 18 inches from the ground; the driving gear should be kept as high as possible.

11. The lorry to be capable of efficient control, and steering at all speeds and reversing at slow speeds, and of being worked and controlled by one man.

12. The lorry to be capable of running forty-eight hours without overhaul or cleaning.

13. The driving wheels not to be less than 4 feet 6 inches in diameter, nor less than 9 inches across the tires, which may be fitted with plain diagonal road strips.

14. No restriction is placed on nature of fuel or class of engine—steam, internal combustion, or otherwise—except that oils under 75° F. flash point (Abel's close test) must not be employed.

In the case of steam engines, an alternate arrangement for burning solid or oil fuel is desirable.

15. In the case of steam engines the construction of the boiler must be such as will comply with the requirements of the Manchester Steam Users' Association.

16. No limit is placed on the tare weight, but the total weight will be taken into consideration, as stated in paragraph (*c*) below.

Note.—In considering the merits of the competing vehicles special importance will be paid to the following points:

(*a*) Prime cost having due regard to efficiency.

(*b*) Distance that can be traveled by the vehicles when fully loaded with 5 tons, with the fuel and water carried on the lorry. (Great importance will be given to this point.)

(*c*) Economy in weight.

(*d*) Durability.

(*e*) Accessibility of all the parts.

(*f*) Simplicity of design.

(*g*) Ease of manipulation.

(*h*) Absence of noise, vibration, and smoke.

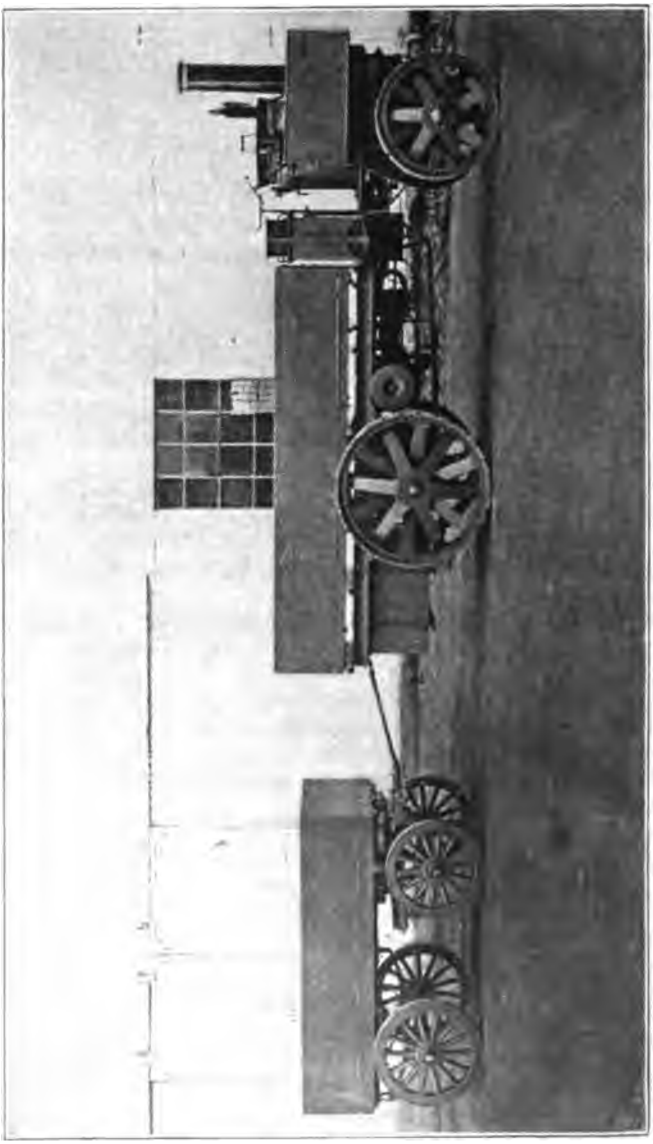


Fig. 26.—The Thornycroft steam wagon. Official No. 6. Fitted with a patent central fired water-tube boiler.

Eleven different lorries were entered for the trials, but only five of these actually competed. These were the Foden steam lorry, the Thornycroft steam wagon (official No. 6), Thornycroft's official No. 7, the Milne 5-ton war lorry, and the Straker military steam lorry.

Messrs. Foden & Sons' steam lorry, which is fired with coke or coal—though it can easily be arranged for liquid fuel—has a main platform 9 feet 4 inches long by 6 feet 4 inches wide. Below this is a lower platform 9 feet long by 2 feet 9 inches wide and 15 inches deep. The general arrangement may be described as the traction-engine type. The boiler is horizontal and forms the front part of the framework, the sides of the framework being of channel steel; these are tied and braced together. The engine is compound and is placed on the top of the boiler; the cylinders are 4 inches and 6½ inches in diameter, respectively; but high-pressure steam can be admitted direct to both cylinders if needed, each of them having an independent exhaust. Driving is effected by a pair of spur wheels, which actuate a cushioned compensating gear by two block chains, two speeds being given, 8 to 1 and 20 to 1. There are two feed pumps, one on the engine and the other an independent single-cylinder pump. The load wheels have cast-steel hubs and double-dished steel-plate sides, with a ⅜ inch lapping plate. They are shod with steel diagonals, 2 by ⅝ inch. The car is on laminated springs, with horn plates and sliding axle boxes.

The Thornycroft steam wagon (official No. 6) is one of the company's standard patterns, and is capable of carrying 3 tons, and drawing a further load of 2 tons on a trailing vehicle. It is fitted with a central-fire water-tube boiler specially arranged for cleaning the internal surfaces—a most important feature when only hard water can be obtained, as is frequently the case. The engine is compound, and fitted with piston valves provided with rings; it is entirely inclosed in a dust-proof and oil-tight case, and is fitted with a constant-lead radial valve gear. The gearing is of machine-cut steel, and drives the road wheels by means of a spring-driving apparatus, which prevents the transmission of road shocks to the gearing and greatly reduces the wear and tear. The springs are of semielliptic pattern, the front axle being mounted so as to give the frame a three-point support to avoid all twisting strains when the wagon is going over rough and uneven

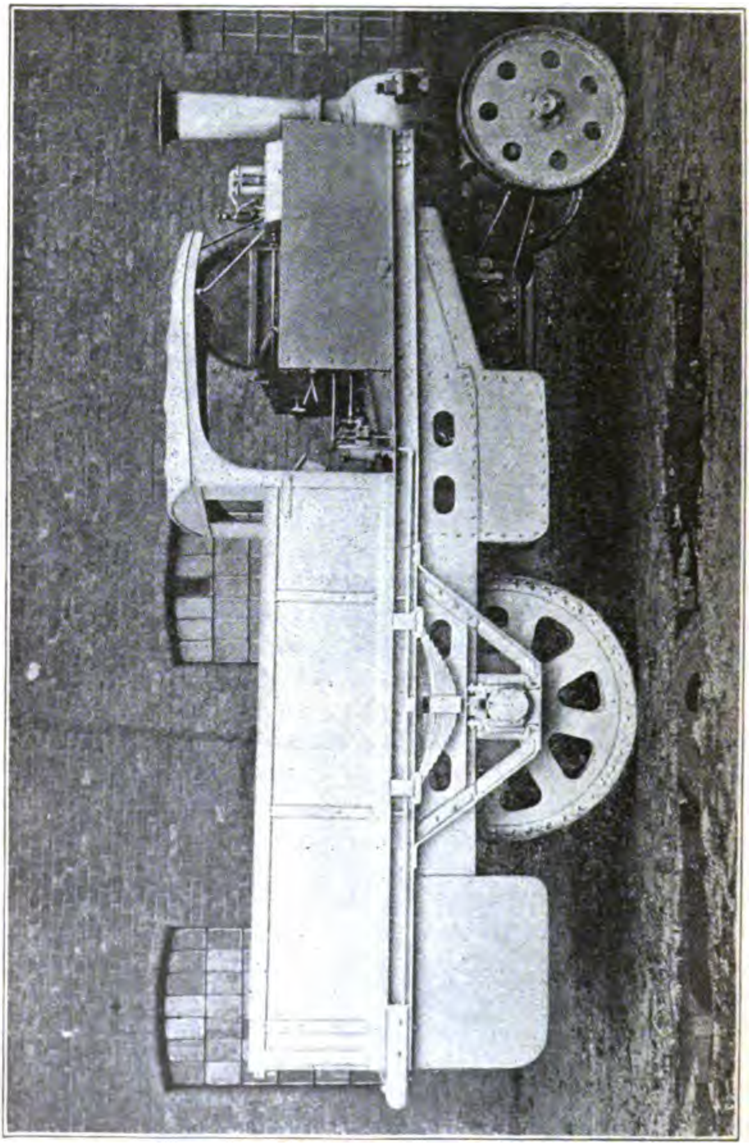


Fig. 27.—The Foden steam lorry. Neat and efficient.

ground. Steering is effected by worm gearing, the axle being of the double-hinged pattern. One man is able to easily perform all the operations required in driving and controlling the vehicle. There is a steam brake capable of stopping the wagon in its own length when running at full speed. A steam jack and water lifter are provided in the equipment. Solid or liquid fuel can be used, the bunkers having a capacity sufficient for 50 miles.

The differential gear may be locked by a friction-braking device, which can be applied without getting underneath the vehicle.

Thornycroft's official No. 7 is specially adapted for use on rough roads and uneven ground, the steering axle being capable of unusually great angle of tilt and the driving wheels being of large diameter. The boiler and engine are situated directly over the driving axle, the carrying platform being provided at the fore part of the vehicle. This arrangement gives the wagon great power to get out of holes in soft ground, etc., and enables it to exert its full power as a tractor when it is not itself laden. The boiler and engine are of the same pattern as the standard wagon. The wagon is fitted with three speeds, a winding drum, and 100 yards of steel rope. A spring draw gear is provided, fitted with the standard military draw hook. The boiler is arranged so that the fire bars can be easily replaced by liquid-fuel burners, which are either of the spraying or vaporing type, according to the nature of the oil which may be available. A condenser is provided, and can be fitted if required. It is arranged so that it can be short-circuited or removed without interfering with other parts of the machinery. The boiler is fed by a pump driven directly from the engine, or by an auxiliary pump or injector. An exhaust feed heater is also provided. The differential gear can be locked in the usual manner, and the usual equipment of steam water lifter, jack, etc., are provided.

The Milne 5-ton war lorry is 21 feet long by 6 feet 6 inches wide. The frame is of channel steel, and the platform space is 13 feet 6 inches by 6 feet. The wheel base is 12 feet 9 inches, and a total load of 6 tons can be carried. The motor is a four-cylinder oil engine, 3½ inches (90 millimeters) in diameter by 4¾ inches (120 millimeters) stroke. The engine is on the Daimler principle throughout and will run at about

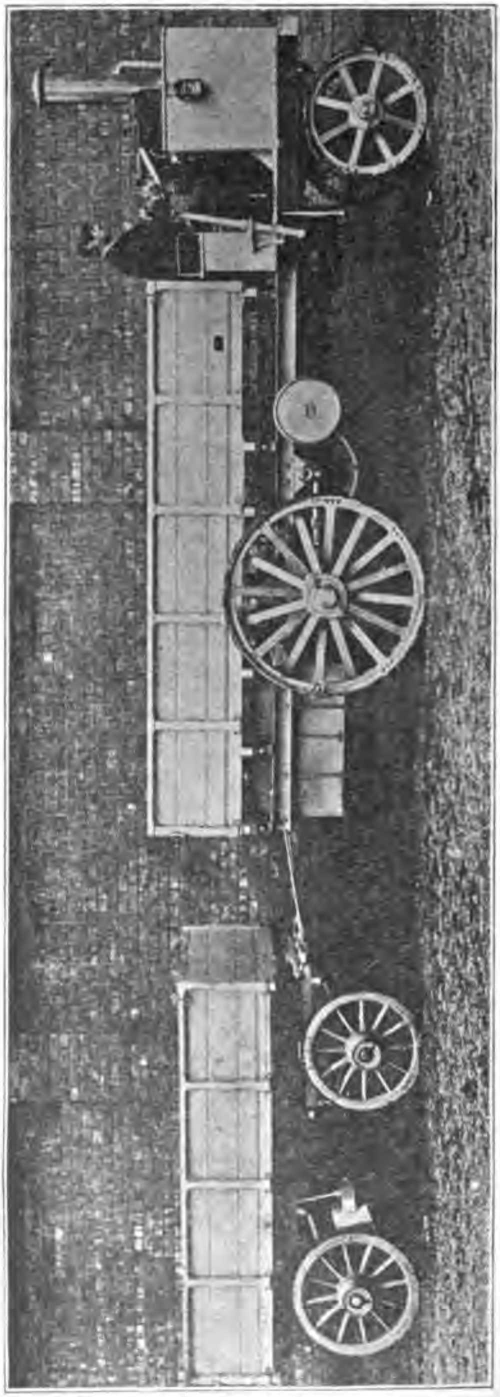


Fig. 28.—The Straker military steam lorry and trailer. Fitted with the water-tube type of boiler.

750 revolutions per minute, giving about 25-brake horsepower. There is a float feed governor and a surface water cooler, with rotary pump. There is a forced lubrication to all engine bearings, and ignition is effected by a magneto-electric device. Transmission is by a single friction cone. Power is taken from the main longitudinal shaft through the differential gear by means of two pinions engaging two internal gear wheels fixed to the back road wheels. There are four changes of speed, the changes being provided by one lever on the Cannstatt principle.

The Straker military steam lorry is 18 feet 6 inches long by 7 feet maximum width. The leading axle is mounted on a central pivot, with antifriction bearings under the boiler. This gives a three-point support, relieving the frame from transverse strain, besides giving ease in steering. The body of the vehicle is of wood, the area being 48 square feet. The wheel base is 10 feet 5 inches. The leading wheels are 2 feet 9 inches in diameter by 5 inches wide. The back wheels are 4 feet 6 inches in diameter, with 9-inch tires. The engine is placed horizontally, and is of the compound type, having cylinders 4 inches and 7 inches by 7 inches stroke. The engine is reversible, the valve gear being specially designed for linking up. At 400 revolutions the power developed is about 25 indicated horsepower. The boiler is of the water-tube type, working at 200 pounds pressure. There are 70 feet of heating surface and 2 feet 2 inches of grate area. There are two speed ratios, giving traveling speeds of from 2 to 8 miles an hour. A countershaft carries a chain pinion driving direct to the back axle, on which there is a locking device for the differential gear. The driving axle has radius rods to keep it in proper position with the countershaft.

The trial competition took place at South Aldershot between December 4 and December 21, 1901. There were four routes laid out for the trials. Route A constituted a triangle, about 30 miles on its three sides, lying to the northwest of Aldershot. Route D was another triangle of approximately the same dimensions, to the southwest of Aldershot, taking in Alton as its southerly point and Farnham near the easterly apex. Route B covered another triangle, northeast of Aldershot, with Bagshot on the north and Guilford on the east. Route C was a fourth triangle, on the northeast of Aldershot. This had Hindhead as an extreme southerly point, and included Farnham and Godalming, crossing the Hog's Back.

Route C was the route selected for the tests of December 13. The ascent from Puttenham over the Hog's Back is very steep, having a gradient of about 1 in 8, the descent on the other side being rather less. The Straker wagon and the Thornycroft wagon No. 6 came first, the Foden wagon and the Milne wagon, with the Daimler motor, were next. On the descent, trials were made as to brake efficiency, the Thornycroft No. 6 pulling up in a very short distance—about 6 feet, which was less than the others. Thornycroft No. 7 did not run.

On December 14 the same route was traversed, but in a reverse direction, the Foden wagon and Thornycroft No. 6 going through without a mishap. The Straker wagon was unfortunate in experiencing considerable trouble with pipe connections; while the Milne wagon was delayed, first by trouble with the sparking mechanism and afterwards by difficulty with the engine. Thornycroft No. 7 also came to grief, for on rounding a corner at Tilford bridge the near side fore wheel went over the edge of the bridge, which was only here protected by a wooden rail. The weight of the vehicle came on the front axle and steering drum, and an hour and a quarter were spent in jacking the wagon on the road again. The steering arrangements were, however, found to be so disorganized that the wagon was taken back to the depot. These trials were conducted with the wagons loaded.

On December 16 Puttenham Hill was climbed without loads on the trailers. Brake tests were also made. This was an easy day, and all the vehicles got through without special accident. During the afternoon the competitors were shown the ground that would have to be covered the next day; and a somewhat unpleasant revelation it was to some of them. The place is known as Scroge's Bottom, and is situated in Long Valley, Aldershot. The ground is an irregular sandy tract, with several sharp ascents, and soft places where water had settled. Over a circular course on this unfriendly ground the wagons were to make three rounds loaded. The test was certainly a severe one; but if motor wagons are to be used in campaigning, they must be prepared to stand rough usage. On December 17 the wagons started to go around the course, and without their trailers made the trip without accident; certainly a creditable performance. In the second round the wagons were loaded, 3 tons on the wagon and 2 tons on the trailer. The Foden wagon started first, but came to grief in crossing a ditch at a very bad place, the fore carriage striking the steep bank of the ditch violently, with the result that it was seriously injured. This wagon, it will be remembered, has a locomotive boiler right in front, with the engine on top. It is not, perhaps, the best distribution of weights for charging ditches. This accident put an end to the Foden wagon for that day. It should be stated that this vehicle was tested more severely than any of the others, as it took the ditch at the most difficult place and at considerable speed. The other vehicles took their trailers over the ground with success. It was not a necessary part of the competition that this ditch should be passed at high speed, the competitors having the option of taking their time in the operation. After the mishap to the Foden wagon the authorities decided that the other wagons should not be required to cross the ditch at the same difficult place.

It was decided to try the remaining vehicles over some very soft and irregular ground. "Spuds" or "paddles" were bolted to the wheels, and in this competition the Thornycroft No. 6 was most successful, dragging its trailer through without a mishap, although the wheels sank in at times almost up to the naves. On one ascent, where the surface was very soft, the Thornycroft No. 7, which was the only one fitted with a winding drum, had to drop its trailer, and, after climbing to the top, hauled the trailer up by means of a wire rope. A good deal of interest centered in the passing of a hollow, through which a stream ran. The wagons had to plunge into this, and the bottom being very soft, the wheels sank in halfway to the axles. The Thornycroft No. 7 was completely bogged at one place and had to drop its trailer. It was extricated by means of a traction engine, that was in attendance, by the aid of wire ropes.

The Straker vehicle met with the last of its many misfortunes, bursting its steam pipe while ploughing through the mud. This took some time to repair, and when the damage was made good the wagon completed the trip, but could not tow its trailer through. The Milne wagon did not take part in this mud-wading competition, its engine having given out just at the end of the previous round.

The Foden wagon, perhaps, showed to most advantage on the average roads. It made, on the whole, the best speeds on the long runs, and its consumption of fuel and water was very low. The low consumption of fuel and water may be due either to the locomotive type of boiler or to the feed-heater device, which also enabled a certain amount of exhaust steam to be condensed and recovered to use over again. It was fitted with a filter to intercept grease. The chimney gases of the Foden wagon were of a lower temperature than those of some of the competing vehicles, to judge by the state of the paint, and also from the fact that the exhaust was delivered from the chimney in very visible clouds, while the exhaust steam of the other wagons was apparently superheated, as it was quite invisible.

Thornycroft No. 6 is practically the standard pattern of the Thornycroft Steam Wagon Company's vehicle of this type. Thornycroft No. 7 was disappointing, considering the great things that were expected of it, but it must be remembered that it was of an entirely new design, and that the makers had not the opportunity to correct the defects which would surely show themselves in experimenting.

The prizes were awarded as follows: First prize to Thornycroft No. 6; second prize to the Foden wagon; third prize to the Straker wagon.

The war office purchased the lorries to which the first and second prizes had been awarded for army use. These will, in all probability, be dispatched to South Africa in the near future.

NOTE.—The British war office announced on November 25, 1901, that a competition for military tractors would be held in the spring of 1903.

X.—CARRIER PIGEONS.

[Condensed from an article of Captain Braun, of the German Army, published in the Militärische Blätter, by Second Lieut. R. S. Clark, Ninth Infantry.]

The usefulness of carrier pigeons on a large scale was first demonstrated during the siege of Paris in 1870. Soon after the close investment of the city by the Germans, numbers of pigeons arrived from the departments, and some were sent from Paris into the interior. The supply of birds was, however, soon exhausted, as a siege of such long duration was not anticipated. Therefore, at the suggestion of M. Ramport, chief of the post office, the pigeons which had arrived in Paris were taken out in a balloon and sent back to their home cots. Dispatches were reduced in size, so that each pigeon carried a large number, and after receipt in Paris were enlarged. This method is now used by the Transatlantic lines. The 57 pigeons which arrived in Paris during the siege brought the noteworthy amount of 1,150,000 private and state dispatches. Since 1871 considerable sums of money have been spent on carrier-pigeon service for military purposes. Notwithstanding the use made of carrier pigeons during the siege of Paris, the organization of a carrier-pigeon service for the army was more difficult than would have been supposed. Suitable breeds of pigeons were obtainable, but there was a great scarcity of trainers, and dovecots of the size required by the military authorities had not been used up to that time. These difficulties were at last surmounted, and military writers, such as General Taubert, Captain Reynaud, and Commandant Bornec, published many works on the subject. Articles appeared about a half a year ago in the periodicals Armée et Marine, France Militaire, and the Reform of Vienna, giving exhaustive accounts of the French experiments with carrier pigeons at sea. The Transatlantic Company (the ship captains of which are naval officers), under the direction of Captain Reynaults (captain of cavalry), were taking out carrier pigeons on their ships and releasing them at sea to carry news to the land. An association of Rennes furnished the birds free of charge. These experiments proved that there was a much larger percentage of loss of birds at sea than on land, but that even at 300 nautical miles there was still a chance of the bird's returning. The experiments in cold weather proved a total failure, not one of the pigeons returning. Admiral Gervais, to whom the reports of the experiments conducted on the *Bretagne* and on the finding of the wreck of the *Bothnia* were submitted, has issued an order that carrier pigeons shall be employed in the naval maneuvers of 1901.

Not all varieties of pigeons are suited for use as carriers. After numerous experiments the turbits (columbia livia turbida) are acknowledged as specially adapted to the purpose. These attain full possession of their faculties after three years' training. They reach an average age of 16 years.

Experiments have been made in France and Russia with falcons and swallows as carriers, but these have not been successful.

Training should commence as early as thirty-five days after hatching, the young ones being permitted to fly in the vicinity of their cots in company with their parents, but they should return to their cots every evening. These exercises should be increased from day to day, and after eight or ten days the young birds hatched at the cot will get to know their home well. When they are 3½ to 4 months old, the proper training for the carrying of letters is begun; this, whenever practicable, should take place in the warm season. Pigeons hatched away from the home cot should not be older than thirty-five days; they require more care than those hatched at the home cot. Their first training covers two or three months. If the birds are older than thirty-five days, one of their wings should be cut to prevent escape, and shortened from time to time during the first year of their life. To begin with the pigeons should be taken in wicker baskets about 10 kilometers (6.2 miles) away. This is soon increased to 20, 30, 50, 80, 130, 210 kilometers (12.4, 18.6, 31 49.7, 80.7, 130.4 miles) and finally at the end of the first year to 300 kilometers (186.3 miles).

Care should be taken to send the birds away in the same direction, and the flights should be begun between 5 and 8 o'clock in the morning. Strong birds after two or three years' training will fly a distance of 700 kilometers (434.7 miles) or even 800 kilometers (496.8 miles), but many birds for various external reasons perish. For training purposes birds should be marked with a colored spot, so as to show in which direction they are employed. In catching birds butterfly nets should be employed, taking care to grasp the bird over the shoulder blades, without squeezing, but keeping the wings close to the body. Dispatches should be written on fine but strong paper, thrust into a goose quill, and fastened to a tail feather of the pigeon by two silk threads, the ends tied crosswise. On the eve of a flight the birds should be placed in a basket, so as to be prepared. One hour before starting they should be fed and watered, and the dispatches tied on, if possible, in a dark room. For safety's sake, two birds should be used in fine weather, four in bad weather, and for important messages, more should be used for the same dispatch. In case of a blizzard, fog, or violent wind the flight should, if possible, be postponed.

Pigeons for fortress service are trained so that part will fly to some central point, such as the capital of the country, and the rest to neighboring fortresses. If the distances between the fortresses or between the line of fortresses and the central point are greater than 400 kilometers (248.4 miles), for safety's sake intermediate stations should be established. Greater distances can be traversed, but this will only result in delay, as a strong bird will leave 400 kilometers (248.4 miles) behind him in six hours. At these intermediate stations the birds coming in should be relieved of their dispatches, a manifold copy made, the original tied to one bird and a copy to another, and the birds released. The station keeper should keep a record book of the pigeons going and coming. He should release the birds himself, but he should have a well-trained assistant to replace him in case of need. Experience teaches us that it is very difficult to disturb an established service between two fortresses. Notwithstanding bad weather, severe cold, and other conditions inimical to flight, it has been shown that at least one-sixth of the pigeons will reach their destination.

Formerly not nearly so much was required of a pigeon as at the present day. This was due to the primitive methods of training and to the lack of facilities for sending the birds away quickly and cheaply. Now, however, it is not rare for a well-bred bird, after a few years' training, to develop a speed of 1,800 meters (1.12 miles) per minute, or 110 kilometers

(68.3 miles) per hour. The average speed of untrained birds amounts to only between 800 and 900 meters (0.5 and 0.56 mile) per minute, but prolonged training and suitable nourishment raise the speed to between 1,300 and 1,500 meters (0.81 and 0.93 miles) per minute under ordinary conditions.

The principal dangers to which pigeons are subjected are the following: (1) High mountains; these compel the birds to go out of the straight course, and to make circuitous flights. (2) Opposing wind; this and the hot wind of Northern Africa and Italy (sirocco) may prevent the flight and kill the pigeons. (3) Dense fog and rain impede quick orientation and swiftness of flight; storms and snow act in the same way. Unless there is urgent necessity pigeons should not be sent out under such conditions. (4) Birds of prey inspire such fear in pigeons that they lose their way if pursued by them.

Numerous investigations carried on in various countries show that no fixed rules can be laid down for the distance that may be traversed by pigeons. A carrier pigeon if let out on a fine summer morning will frequently leave behind him 1,000 kilometers (621 miles) in the course of the day, but often it will rest, look for food, and if need be interrupt its flight for the night. The weather, and above all, the shape of the earth's surface play an important role. In the competitive races from Madrid to Brussels, out of 160 choice pigeons only 7 returned to their home in Brussels, and these were away a much longer time than was estimated by their breeders. A violent storm was then raging in the Pyrenees, and this probably killed a large part of the birds. I am of the opinion that 1,000 kilometers (621 miles) is enough for a military pigeon, and if a longer distance is required, intermediate stations should be established. In fact, it is much better for safety's sake that intermediate stations should be established if the distance is over 400 kilometers (248.4 miles).

It has been proved, after many years' experience, that the best food for pigeons is one consisting of vetch and peas from January to April; of field beans from April to November; and of Indian corn in November and December. Pigeons, like horses, cows, and sheep, require every now and again a cake of salt, mixed with clay and placed in their food. A pigeon requires at most 50 grams (1.76 ounces) per day, which makes a pigeon cost 12 cents a month.

Dovecots should be arranged so as not to be affected by moisture, and special pains should be taken to have good ventilation, as pigeons are subject to epidemics. They should also be placed high above the ground, as carrier pigeons like to live in high places, and this also improves their eyesight. In well-built dovecots there should be an allowance of 1 cubic meter of space to each pair and devices used to renew foul air. Space should be set aside for young pigeons hatched at the cot or added by purchase. Each cage should be well lighted and have an outside opening. The cages set aside for couples should be provided with a nest, food, and bath utensils. All cages should be calcimined, not with white, but with a grayish blue, as this color accustoms the eyes of the pigeons to the light outside. The floors should be cleaned and sprinkled with 2 or 3 centimeters (0.8 or 1.2 inches) of dry sand every day. The cot should have a room for returning pigeons, arranged so that a pigeon can enter but can not leave. An exhausted bird pecking at the food sprinkled on the floor should ring an electric bell, thus calling the watchman. The watchman catches the bird in a net, takes off the dispatch, and places the bird in its own cage, where it can feed and rest.

France has always been well provided with carrier pigeons, raised by numerous private associations, which use them for sporting purposes. In time of war, the law places pigeons raised by private owners at the disposal of the ministry of war, which intends to reenforce its military carrier-pigeon stations with these. The ministry of war also exercises the right to inspect the dovecots of private owners in time of peace, but the pigeons of private owners are accorded the same rights in races held by the government as the military pigeons. Killing carrier pigeons is punishable by law with fines and imprisonment. A law is now proposed to prohibit foreign breeding associations from keeping pigeons on French soil; this is aimed at England.

France employs carrier pigeons in three ways: (1) for fortress service; (2) for cavalry service; (3) for naval service.

The fortresses at Paris, Lyons, Maubeuge, Lille, Nice, Corsica, Perpignan, Bayonne, Dunkirk, Verdun, Toul, Epinal, Reims, Algeria, Belfort, Besancon, Langres, Dijon, Briancon, and Grenoble are placed under the command of 20 "commandants supérieur de la défense," and the carrier-pigeon service in these localities is under them. Members of carrier pigeon associations who have attained a certain knowledge of pigeons render their military service in the engineer regiments, Nos. 1 to 6, and after having received a short course of instruction are detailed in the carrier pigeon stations. Paris maintains direct communication with the fortresses of the northern frontier, the maximum distance being 239 kilometers (138.4 miles). Lyons and Langres serve for intermediate points between the southeast and northeast. The three above-mentioned stations are, even in time of peace, so well supplied with pigeons that they could maintain communication with each other for six months.

For some years experiments have been conducted in using pigeons with cavalry. General Benoist is the prime mover in this problem, and next to him the prominent pigeon breeder, M. Laurent. Cavalry patrols are provided with from two to four birds. The pigeons are placed in baskets which the riders carry on their backs. Experiments made in fastening the baskets to the saddles, packing in tin pipes, etc., have proved a failure. The baskets now in use are made of willow twigs, and are lined with horsehair, to protect the birds from blows; these hold one or two birds. A feed bag made of a translucent material, in which the pigeons are fed and watered, is fastened to each basket. During halts for the night the pigeons are taken out of the basket and placed in the bag. Experiments have proved that pigeons can be kept a week in the bag and still be ready for use. Dispatches are prepared on special slips of paper with printed headline, which are placed in goose quills and fastened to a tail feather of the bird.

A cavalry pigeon service school has been established in Vaugirard. Every year 12 cavalrymen, already acquainted with the care of pigeons, are detailed there from the different regiments. About the end of January, 1901, the minister of war, General André, issued a circular in which the following questions appeared: (*a*) Are private owners willing to lend their pigeons to cavalry regiments? (*b*) Will private owners consent to have their pigeons, while still young, trained in the barracks? (*c*) Are there private dovecots near the barracks, so as to be available in case of mobilization? (*d*) What would be the cost of delivery and training of the birds?

ARGENTINA.

This country has a carrier-pigeon service consisting of seven stations, which constitutes a sort of telegraph line between the capital and the Andes. The work done by this service is said to be exceedingly satisfactory.

AUSTRIA-HUNGARY.

Carrier-pigeon raising is very little engaged in, in either Austria or Hungary. Only a few associations exist, and these have only a very small number of birds at their disposal; the prizes offered by the government are insignificant, so that pigeon-raising is limited to a few rich people. One breeder places his pigeons every year, free of charge, at the disposal of the balloon section at Vienna. These pigeons are employed at balloon ascensions for communication between the balloon and the ground. According to the Militär Zeitung these experiments, unlike the results in other countries, have proved very satisfactory. Notwithstanding the statement in the Militär Zeitung, there has been a great loss of pigeons in these experiments. One-half of the pigeons set loose from the balloon on June 20, 1899, did not return at all. One bird, however, returned after six months, and two others after nine months; the former still bore his dispatches, but the latter had been deprived of their dispatches and some of their tail feathers.

BELGIUM.

This country possesses an extraordinary number of private pigeon-breeding associations (in which the breeding of pigeons has reached a very high state of development). These arrange numerous races which are encouraged by the Government. At the large fortress at Antwerp there is a large military pigeon station under the command of the commandant, where engineer soldiers are trained in raising pigeons.

BRAZIL.

Brazil established a military pigeon service under the third section of the general staff in 1896. The stations, scattered over the country, are located in the old fortresses. More particulars concerning the service could not be obtained.

BULGARIA.

Since 1894 military carrier pigeons have been raised in Varna and Vidin. The stations consist of 1 officer, 1 noncommissioned officer, and 5 pioneers. They are apparently doing good work.

DENMARK.

There are numerous associations helped by the government. These, for compensation, lend their pigeons to the army and navy for use during the maneuvers. These associations date from 1878. The naval exercises are held each year in Lund and Kattegat.

ENGLAND.

At the present time there are only a few pigeons used by the government. The stations are situated in the garrisons on the coast and the southern part of the country. The pigeons are mostly the property of private owners, who receive small subsidies from the Government. A few pigeons are employed for service between guard ships, light ships, and the shore. During the last fifteen years flights have been made across the English Channel, as far as the French city La Rochelle.

GERMANY.

Before the war of 1870 the use of carrier pigeons for military purposes was unknown, although there was a considerable number of pigeon-breeding associations. After the war, assistance was asked for these ever-increasing associations from the government, and they were subsidized with both money and prizes. It was not, however, until 1877 that the military carrier-pigeon section was organized. This was placed under the inspection of the telegraphic troops. Bavaria has an independent pigeon station. For Germany at large, Spandau is the central station, and Cologne and Mainz serve as intermediate points for the western frontier. There are also stations at Metz, Danzig, Thorn, Graudenz, Konigsberg, etc. The strength of these stations varies from 100 to 1,000 birds each.

In the fortress service the birds are trained by the inspector of ramparts and a civilian trainer, who are under the orders of the engineer officer of the fortress.

Communication between private associations on the one hand and between military stations on the other is much encouraged by the government. The private associations flourish especially in the western part of the empire. In 1899 these raised 27,000 birds, and in 1900 32,000. On one occasion, for the races between Spandau and Dortmund, a special train was sent out with 16 cars filled with 8,000 pigeons. In these races about 10 per cent were lost. The German pigeon breeders now have 73,000 birds, and declare themselves willing to place them at the disposal of the government for payment.

During the imperial maneuvers of last year the cavalry divisions were furnished with pigeons from the neighboring military station and associations. The pigeons were carried in baskets on the backs of the riders, and it has been said did excellent service.

Experiments are made with carrier pigeons every autumn in the navy. The cruisers in the North and Baltic seas are kept in communication with the stations at Kiel and Wilhelmshaven by aid of carrier pigeons.

ITALY.

Both private associations and military stations use the Belgian breed, as the native breed has not yet proved adaptable for the purpose. Prizes are given by the government in the shape of gold, silver, and bronze medals in the races. The birds are trained by the engineers, and stations are established on the French and Austrain frontiers, and in Sicily and Sardinia. In the Adriatic and Mediterranean seas the fleet has been experimenting with pigeons to use in cooperation with the military carrier-pigeon stations.

NETHERLANDS.

This country has no carrier-pigeon establishment, but there are private associations which might be of use in case of war. Dutch pigeons acclimatized are used frequently in Java and Sumatra for both private and state dispatches, on account of inadequate telegraphic communication.

PORTUGAL.

Experiments with military pigeons were carried on as early as 1876, but it was not until December 27, 1888, that instructions were issued for the service. There are at present 12 military stations which keep up communication with Lisbon;

the main station has 400 pigeons. The results have not yet proved satisfactory to the government, probably on account of the mountainous character of the country.

ROUMANIA.

Roumania has, according to newspaper accounts, begun experiments with pigeons, but owing to lack of funds these have come to a standstill. At the present time no budget item is devoted to the purpose.

RUSSIA.

The military carrier-pigeon service was first established in 1870 between St. Petersburg and Krasnoye-Selo, the great maneuver camp. The next year a station was established in Warsaw, and in 1873 in Moscow. At first there were a great many difficulties in establishing the service, as the native pigeon is not adapted for the purpose, and the acclimatization of the Belgian pigeon was only obtained after frequent crossing.

There are now stations at St. Petersburg, Krasnoye-Selo, Brest-Litovski, Ivangorod, Novogeorgievsk, and Luniniec. The service is under the engineers, and the number varies according to the importance of the fortress. In 1878 regulations for the military carrier-pigeon service appeared. These classify the fortresses into four categories according to whether they communicate in one, two, three, or four directions. According to the Russki Invalid, it is proposed to enlarge the cots and increase their number.

As in France and in Germany, there have been trials for using pigeons with cavalry, larger reconnoissance bodies being provided with pigeons. These trials are believed to have proved that it takes one fifth the time to send dispatches by pigeons that it does with mounted orderlies.

A station for the use of the navy was opened on the Baltic sea in the beginning of 1900. This station supplies the Russian cruisers with the pigeons employed in the maneuvers.

SPAIN.

In this country pigeons have been employed for some time. The pigeons used are those descended from the ones brought over by the Moors, but in the last thirty years these have been improved by crossing with the Belgian pigeon. In 1879 a station was established in Guadalajara, and another at Madrid in 1880. The latter has become the central station, while there are 18 stations on the coast, near the Pyrenees, and on the Portuguese frontier. Intermediate stations have also been established at Valladolid, Saragossa, Valencia, Cordova, and Magala. The establishment at Guadalajara has also charge of military photography, and is under the command of a lieutenant colonel.

SWEDEN.

The only fact that can be ascertained is that a station was established in the fortress of Carlsborg in 1886.

SWITZERLAND.

Switzerland began experiments in 1879, at first without satisfactory results, as the pigeons were unwilling to fly over the high mountains. Thanks to good breeding and training this has changed for the better. On January 24, 1889, the federal council issued the regulations for the military carrier-pigeon service. This provided for stations, at Thun as a central point, at Basel, Zurich, and Wesen (in St. Gallen on the Wallenstadt Lake), 120 birds at each station. These stations are for use on the German and Austrian frontiers. In case of war great store is set on the amateur pigeon associations which the government helps by offering a premium on all carrier pigeons raised in Switzerland.

TURKEY.

A few years ago a military carrier-pigeon station was established in Chataldia, in the fortified line [?] of Constantinople.

XI.—MISCELLANEOUS NOTES.

The following notes on military matters are collected from various sources:

BELGIUM.

TRIALS WITH FOLDING BICYCLES.

Trials are being made in the regiment of carbineers with a folding bicycle with which the cyclist companies are to be supplied. The price of each is $51.68. It has the following advantages over the present system: The tire is provided with an unbreakable band; an appliance is affixed to the frame by means of which the bicycle can be placed to stand alone. The trials have so far given very satisfactory results.—*Armeeblatt, May 15, 1901.*

CARRIER PIGEONS.

The following data concerning the carrier-pigeon service in Belgium have been published in the Revue Militaire Suisse of February, 1901:

The carrier-pigeon service was organized in Belgium in 1896. There are stations in Antwerp, Liege, and Namur. Birds are also assigned to the second regiment of engineers. Each of the pigeon houses may contain from 300 to 600 pigeons, and each house has a lazaretto and a place for the raising of young pigeons, attached to it. They are intrusted to the care of an officer, assisted by a photographer and a private.

The three stations contain at present about 1,000 pigeons, obtained almost exclusively by reproduction in these pigeon houses.

In training the pigeons great care is given to develop the instinct of orientation and affection for the nest, the rapidity of flight being of secondary consideration. The distance traversed by the pigeons is not large, as the aim is only to keep up communication, in case of siege, between Antwerp, Liege, Namur, Diest, and Termonde. No pigeon-carrier service has as yet been established between the field troops and the fortresses, nor in the cavalry or other commands.

Each pigeon wears on the wing the mark of its station, and has on one leg an aluminum ring placed on the ninth day after its birth so that it is impossible to remove the ring later. On this ring are engraved the number and initials of the pigeon house.

The reports are photographed, the scale being reduced to $\frac{1}{1600}$, on very light and small films. Before being read they must be enlarged, either by photography or by a system of projection. Sometimes they are read by means of a microscope and dictated by the reader to a clerk.

The films may be obtained from sensitive sheets with greater or lesser rapidity, according to the difficulty of detaching them from the glass. At the three stations there is, for war use, a provision of special sheets which allow the reports to be sent out fifteen minutes after receipt, no matter how long they may be.

The films are placed in a small aluminum case 1.5 centimeters long and attached to one of the legs of the pigeon.

This system, says the Revue, is the most practical and the surest. It does not impede the flight of the pigeon and the case containing the report can not be lost on the way.—*Rivista di Artigleria e Genio, March, 1901.*

CHINA.

A SURGEON'S OBSERVATIONS ON WOUNDS IN THE CHINESE WAR.

The following remarks on wounds produced by Chinese bullets are taken from a Russian military paper, Viestnik Offitserskoy Shkoly. These observations are so much the more interesting as they come from a Russian surgeon who, in addition to many French and Japanese wounded, took care of some 500 Russians.

The greater part of the wounds fell to the arms and legs, and in decreasing order came wounds of the stomach, the thoracic cavity, the head, and the face. Wounds produced by bullets were by far more numerous than those made by artillery projectiles.

The bullets with metallic jackets were relatively the most humanitarian of all. They did not tear the tissues, rarely broke the bones, and did not soil the flesh. Wounds made by these bullets, with the exception of those affecting the abdominal cavity, generally had a favorable issue.

Almost all the wounded whose thoracic cavity or lungs had been perforated recovered. Wounds of the cranium likewise had favorable issues. Included in that class of wounds "if death does not follow immediately, recovery takes place," were even those where there was lost the amount of a teaspoonful of cerebral substance.

On the contrary, wounds produced by pieces of artillery projectiles were generally serious. The wounds grew purulent and in most instances, in cases of limbs, amputation was necessary.

The Russian surgeon adds that, on account of the difficulties encountered in the removal of the wounded, the amputations had to be done on the spot, i. e., at the principal dressing station. The issue of these operations was always favorable.—*Revue du Cercle Militaire, March 23, 1901.*

FRANCE.

THE RECRUIT CONTINGENT FOR 1900.

The French minister of war has recently presented to the French chambers his report on the recruit contingent for 1900, of which the *Armée et Marine* publishes a summary. The total number of those liable to serve, of the class 1900, was 324,334, of whom 27,297 were declared physically unfit. The defects were classified as follows: Diseases of the skin, 499; sight, 3,286; hearing, 1,117; mouth and teeth, 245; voice, 416; nose, 79; scrofulous, 590; chest, 3,163; abdomen, 3,971; genital organs, 675; limbs, 3,565; bones, 2,128; nerves, 2,578; feeble constitution, 1,172; miscellaneous, 3,813. The deduction of these 27,297 left 297,037. This last number was further reduced by 31,002 who had already been entered for the navy, 19,523 who were classed for the auxiliary services, 49,488 cases which were adjourned, and 90 persons who were excluded. These reductions left a net 196,934 men for the army, while 78,664 cases adjourned from previous years yielded a net 27,958 men, and brought the total number of those joining the colors up to 224,892 men. These consisted of 74,960 one-year men and 149,932 two or three year men, and they were distributed as follows:

	One year.	Two or three years.	Totals.
Colonial army:			
Infantry		3,464	3,464
Artillery		218	218
Home army:			
Infantry	60,175	94,870	155,045
Cavalry		20,600	20,600
Artillery	10,303	20,584	30,887
Engineers	1,223	4,016	5,239
Army service	1,221	2,060	3,281
Administration and medical	2,038	4,120	6,158
Totals	74,960	149,932	224,892

Of the 324,334 forming the gross total of those belonging to the class 1900 there were 14,707 quite unlettered, 4,783 who knew how to read only, 37,098 who could just read and write, 244,059 who had received an elementary education, 4,799 who held certificates, 6,469 graduates, and 12,419 whose educational status was unknown. With regard to employments, there were 135,887 agricultural laborers, 11,362 masons and bricklayers, 16,753 carpenters and cabinetmakers, 22,821 smiths and metal workers, 7,314 shoemakers and saddlers, 8,250 workers in factories, 7,772 millers and bakers, 4,958 butchers, 7,362 coachmen and drivers, 2,918 tailors, 5,677 boat and barge men, 11,228 clerks, 655 telegraphists, 1,610 railway employees, 70,720 of miscellaneous employments, and 10,047 of no employment. There were 8,387 men under 5 feet in height and 31,896 over 5 feet 8 inches. The number of volunteers for three, four, or five years' service in 1900 was 25,468, namely, 3,256 in the navy, 3,504 in the colonial infantry, 1,058 in the colonial artillery, and in the home army, 10,668 in the infantry, 2,271 in the cavalry, 4,118 in the artillery, and 593 in the engineers. The recruit contingent of Algeria numbered 4,860 in 1900; of those 408 were unfit, 761 were already in the service, 3,116 joined the colors, 234 joined the auxiliary services, and one was excluded.—*London Times*, *October 16*, *1901.*

MILITARY HORSE TOURNAMENTS.

A circular of the French war office, dated August 26, authorizes the organization each year, in connection with the Paris horse show, of a competition between military horses, to be known as "championnat annuel du cheval d'armes." The object of the competition will be to encourage the proper military training of the horse as well as the true principles of horsemanship, without, however, making the tests so severe as to exclude from competition the ordinary horses supplied by the remount department. The first test will be a steeplechase of 2½ miles with twelve obstacles. In this test the jury will take no count of the order of arrival, but only of the manner in which the course is run, taking note of refusals to take an obstacle, of falls and any irregularity in the gait, this last to be between a gallop as at maneuvers and a racing speed. The second test will be of the training of the horse. Each horseman will be free to put his horse through any movements he pleases, and will be allowed twenty minutes for this. Count will be taken, not of the difficulty of the movements, but of their appropriateness and the manner in which they are done. The third test will be one of endurance, and will be judged by the condition of the horse after a run of 30 miles accomplished in the prescribed time. The fourth and last test will be in jumping, in which, again, it will be a question of style, the jumps being not too difficult for the average military horse. Each cavalry regiment will send one competitor. Officers' service horses of seven to nine years, ridden by their owners, will be admitted. Prizes consisting of works of art to the value of £120, £60, and £20 will be presented by the Société Hippique Française.—*London Times, 1901.*

CYCLIST COMPANIES.

The formation of two cyclist companies, for which the budget has furnished the necessary funds, is going on in the one hundred and thirty-second infantry regiment at Reims and the one hundred and forty-seventh at Sedan. Each will number 150 men and 120 bicycles. Besides, they will be given a few folding bicycles of the Gerard model for instructional purposes. The enlisted men carry the 1892 artillery carbine and a bayonet, and the five buglers carry the regulation revolver. The uniform is that of the Alpine line infantry (regiments Nos. 97 and 159).—*Militär-Wochenblatt; taken from le Progrès Militaire, March 20, 1901.*

NEW INFANTRY DRILL REGULATIONS.

A new set of infantry drill regulations are soon to be introduced in the French army. They are being tried in one regiment in each army corps, the regimental commanders in charge of these trials having been asked to send in their reports concerning their experiences and opinions with relation to the new formations. The proposed regulations abandon all old theories, changing not only the individual instruction, but also the company and battalion drill. Most of the movements, as well as the manual of arms, are considerably simplified. For instance, the "about face" is executed according to the German method, in a single motion, whereas heretofore two, and formerly even three, were necessary. Certain cavalry formations, which are simple and have proved their value, are to be introduced in the infantry also;

for instance, the troops are divided off by fours and have to form in line within the shortest possible space. The practice of deploying in double rank, with its complicated details, is entirely abolished. Company movements in column will be executed only in double time upon a single command from the company commander. The platoon leaders are to give no commands in future, but merely to see that the troops keep step. The deployment into line of skirmishers also takes place in double time without regard to the order of succession of the several files. In short, the new infantry drill regulations, which are modeled exactly after those recently introduced in the German army, seek to simplify and facilitate all the movements and exercises. They are to be introduced in March this year in all regiments.—*Allgemeine Schweizerische Militär-Zeitung, March 23, 1901; taken from Danzer's Armee-Zeitung.*

CARRIER PIGEONS.

A circular of July 17, 1901, states that studies pursued during several years have shown the utility of the employment of carrier pigeons in time of war for the transmission of information. It is consequently necessary to instruct cavalry troops in time of peace in the employment of this means of correspondence in conditions as near as possible to those in which the cavalry will have to operate in time of war.

It is not necessary to teach the cavalrymen the methods employed for the training of the carrier pigeons; it will be sufficient to instruct the men in the transportation and employment of the birds. Field-service exercises executed in time of peace around the garrison and long-distance reconnoissance undertaken by officers will suffice to accomplish these results.

The regiments who can procure the carrier pigeons necessary for their exercises by utilizing the aid of local carrier-pigeon societies, are authorized to take advantage of the facilities which these societies may place at their disposal.

The seventeen regiments which have not found any resources in their garrisons are to be detached to the nearest military carrier-pigeon post, which shall keep the number of pigeons necessary for their instruction, that is, about ten pigeons per regiment.—*Revue du Cercle Militaire, August 24, 1901.*

CARRIER-PIGEON SERVICE.

The Internationale Revue über die gesammten Armeen und Flotten states that all the French fortifications on the northern and eastern frontier are provided with carrier-pigeon stations. The great central station in Paris can thus correspond directly with all the fortresses of the northern frontier. For correspondence with the fortresses of the eastern frontier a central intermediary station has been established at Langres, and Lyons has been designated as an intermediary station between Paris and the fortified places on the Italian frontier.

The same magazine has also stated that in case of mobilization all the independent cavalry divisions would be provided with carrier pigeons in order to be able to execute more quickly reconnoitering service.—*Rivista di Artigleria e Genio, March, 1901.*

CREATION OF A SCHOOL OF ENGINEERS AT ALGIERS.

A school of engineers has been created since April 1, 1901, at Algiers, with the twenty-sixth battalion of engineers, the functions of which from an administrative point of view are similar to the schools with the regiments of this arm according to the regulations of February 16, 1900.

The director of this school is the commander of the twenty-sixth battalion of engineers.—*Revue du Cercle Militaire, April 6, 1901.*

REGIMENTAL INFANTRY SCHOOLS INSTITUTED.

According to a ministerial instruction of August 6, 1901, a school is to be established with each infantry regiment and battalion. It shall consist of two courses, the primary and the preparatory courses. The primary course is a company school, and the illiterate men are there taught reading, writing, and arithmetic. Those who have received this rudimentary education need not go to this course. The preparatory course prepares for the career of officer. The instruction is divided into two grades between November 15 and August 1. Each sergeant or corporal may be admitted to the lower grade, but must have served at least one year. To the higher grade are admitted noncommissioned officers preparing to enter the St. Maixent school for noncommissioned officers desiring to become second lieutenants. The instruction in the higher grade is divided into two sections, the first from November 15 to March 15, and the second from March 15 to August 1. The first course serves to review the knowledge already possessed, while the second prepares for the entrance examinations at St. Maixent. In the first section are taught French, history, geography, arithmetic, geometry, and in the second all the subjects comprised in the programme for examination. The teachers are lieutenants detailed for two years. They instruct their pupils through both sections. In general, instruction is given in winter three times a week and in summer twice a week for one to one and one-half hours. Examination is required for the passing from the lower grade to the higher.—*Militär-Wochenblatt, October 9, 1901.*

A NEW MILITARY SCHOOL.

The school founded in Paris from a union of the staff officers of the reserve and landwehr has been elevated by the minister of war to a school of instruction under the military government of Paris. Professional papers greet this new creation with satisfaction, as it assures the organization of courses of instruction for the officers of the landwehr and the reserve. In the military cercle of Paris lectures and discourses will be given for the officers of the general staff every Wednesday.—*Internationale Revue, March, 1901.*

CROSSING STREAMS.

Experiments with an apparatus invented by Captain Cluchagne have recently been made by the seventy-seventh infantry regiment in the crossing of streams. This apparatus is very simple and is composed of metallic buoys of cylindrical shape 30 centimeters in length and 15 centimeters in diameter; their floating capacity is such that a man with his clothes on and not knowing how to swim may cross a river, the body straight, the forearms alone placed on the cylinder, making simply the motion of a man walking.

The cylindrical buoy may be formed of two adjustable parts, which, at halts, may be employed as kettles or pails. During march an extra blouse or other effects that ought to be protected from the rain may be carried in it. Joined to each other, these buoys allow the construction of a raft or even a bridge. A raft capable of carrying six men and their equipment may be constructed of 160 buoys. With 243 buoys, which Çaptain Cluchagne calls "étuis-couvre-veste," so disposed as to form eight long tubes joined together, a floating foot bridge 12 meters long and 0.90 meter wide, capable of carrying simultaneously ten men, fully equipped, and four abreast, may be constructed.—*Revue de l'Intendance, September, 1901.*

CROSSING RIVERS.

Interesting experiments on the crossing of rivers were made on the 25th and 26th of June at Mareuil-sur-Ay, in the vicinity of Epernay, by the brigadier students of the thirty-first dragoons under the direction of Lieutenant Masin and in the presence of Gen. Jules de Benoit, commander of the third cavalry division, and Colonel de Tartigny, commander of the regiment.

The new proceeding employed is remarkable for its simplicity and allows the rapid transport over a stream of a troop of cavalrymen who do not know how to swim, by making use only of the regulation equipment.

The issue sack containing the kit and the saddlebags form an individual buoy for each man. This buoy is fixed on his back, as well as the weapons, by means of the stirrup leather in the shape of suspenders, the belt, and the sword knot; the whole is so adjusted that the head of the man is constantly maintained above water.

Cavalrymen who can not swim at all, thus equipped and kept together by their forage cord, may be pulled to the other bank by means of a cord, by groups of ten to twelve men, and if the current is not very swift they may be towed by sixes and eights by a few good swimmers. In such cases the horses cross alone with the saddles on. Supplied with these buoys, the men who can not swim may likewise cross by the side of their horses, holding them by the mane and letting themselves be towed along by them.

This mode of crossing, in addition to rapidity, presents the great advantage of insuring the transportation of effects in a dry condition. The experiments succeeded fully.—*Revue de Cavalerie, July, 1901.*

GERMANY.

CROSSING A RIVER BY SWIMMING BY AN INFANTRY REGIMENT.

The one hundred and twenty-fifth regiment, stationed at Stuttgart, crossed the Neckar by swimming at a distance of some 10 kilometers from this city. At the point where the crossing took place the Neckar is some 30 meters wide and about 2½ meters deep. Two cables were stretched across the river for the men who could not swim. Boats manned by one officer and three good swimmers each were placed near the banks and in the middle of the stream in order to prevent all accidents.

The operations took place in the following way:

The regiment reached the banks of the Neckar at 7 a. m.; the men immediately undressed, company after company, remaining in their shirts only. Each man wrapped his clothing and equipment in waterproof cloth, forming a small bundle, to which he attached his rifle. In each company the good swimmers crossed the river first, pushing before them these packages. The men who did not know how to swim crossed the stream in fours, holding fast to the cords and pulling after them their bundles. As soon as the men reached the opposite bank they dressed and immediately ate a lunch. The time in crossing was twenty minutes per company. The operation was concluded without accident.—*Revue du Cercle Militaire, October 26, 1901.*

FIRING AT A BALLOON.

The Magdebourg Gazette publishes the following on the firing at a balloon which took place at the camp of instruction of Alten-Grabow:

"The guns firing at a balloon hovering in the air 300 meters above ground were placed near Briesenthal. The distance to Gloine, over which the balloon was floating, was 4,800 meters. Sixty shells were allotted for these exercises, but the balloon was hit at the seventeenth. The shell burst at the moment it reached the mark; the gas contained in the balloon took fire and the envelope surrounded by a cloud of smoke fell to the ground."—*Internationale Revue über die gesammten Armeen und Flotten, October, 1901, supplement 31.*

FIELD EQUIPMENT OF THE INFANTRY.

The German infantryman carries a weight of 59.5 pounds—average load to be carried by a man of average height (5 feet 5¾ inches); the weight is correspondingly increased or decreased for taller or smaller men. The above-mentioned weight comprises the clothing (11.9 pounds), the equipment (8.7 pounds), the pack (12.4 pounds), the arms and ammunition

(18.8 pounds), and the supplies of provisions (7.1 pounds). To the clothing belong blouse, cravat, cloth trousers and drawers, suspenders, shirt, high boots, socks or foot cloths, package of bandages, pocket handkerchief, mark of recognition, and chest bag; the equipment comprises helmet with appurtenances, helmet cover, knapsack with straps, bag for tentage appurtenances, belt and buckle, bread bag with cooking utensils and straps, sword knot, two cartridge pouches, canteen and tumbler. The pack comprises overcoat with three straps, tentage, field cap, shirt, laced boots, socks or foot cloths, hymn book and pay book, toothbrush, pocket handkerchief, knife, spoon, sewing kit, and cleaning kit. The armament consists of the rifle with cleaning cord and side arms, the ammunition of 120 cartridges, of which 90 are carried in the cartridge pouches and 30 in the knapsack. With regard to provisions, the man carries his breakfast and also a ration consisting of hardtack, preserved meat and vegetables, salt and coffee (kept in five bags and three tins), the contents of the canteen, as well as tobacco and cigars. Intrenching tools (spade, ax, and pickax) are carried only by about half the men in the field and are consequently not included in the above-mentioned weights. The small spade with sheath weighs 2 pounds, the ax with sheath 2.4 pounds, and the pickax with sheath weighs 3.2 pounds. The manner of carrying these is probably well known. The kitchen utensils are strapped on the knapsack cover. The overcoat and tent rolls are placed around the three sides of the knapsack so that they do not protrude over the lower end of it, and are fastened to the knapsack on the three sides by the overcoat straps. The tent cloth is separate and placed flat upon the overcoat roll. An overcoat and tent roll regularly fixed is from 0.4 to 5.5 inches wide and from 3.2 to 3.9 inches high. The bread bag, the two cartridge pouches, and the intrenching tools are carried on the belt.—*Schweizerische Militärische Blätter, September, 1901.*

NEW EQUIPMENT OF THE GERMAN EXPEDITIONARY CORPS TO CHINA.

The new equipment consists of eight very small cartridge pouches, one sack with the frame pack which belongs to it and which replaces the knapsack, the bread and tent-pole pouch, belt with sabretache, and gear for carrying the cooking utensils. Most articles are made of very strong yet very light leather of a grayish-green color. The soldiers call it the "green equipment." The small cartridge pouches are very practical. They hold 15 cartridges in three rows in each of them. They are carried on the belt and distributed equally in front as the Boers used to carry theirs. The frame pack is quite similar to that of the knapsack, instead of which there is a frame of double leather to which the sack is strapped. The bag and the bread and tent-pole pouches are made of green waterproof canvas. The principal advantages of the new equipment are its neutral tint and very light weight.—*Allgemeine Schweizerische Militärzeitung, April 6, 1901.*

CIVIL DRESS OF OFFICERS.

The emperor of Germany lately issued an order prohibiting officers of all grades and all branches from wearing civilian dress without special authorization, which may be granted in special cases only.

It is considered undignified in Germany for an officer to put on civilian dress. The emperor himself considers it so, as he expressly says: "The gentlemen who are ashamed of the dress I give them would do better to lay it aside for good. I have nothing to say in this respect. But as long as they keep it they must wear it constantly."—*Revista Militar, Portuguese, February 15, 1901.*

SCHOOL FOR CAVALRY TELEGRAPHERS.

The Militär-Zeitung gives some information concerning this school. The following are the principal data:

This school, established in Berlin, is attached to battalion No. 1 of telegraphers; its aim is to instruct cavalry officers, noncommissioned officers, and reenlisted men in the manipulation and employment of telegraph appliances belonging to this arm.

The permanent cadre comprises: One captain or lieutenant, 6 lieutenants, 1 sergeant major, 9 noncommissioned officers, and several orderlies.

The following are detached each year to this school: For a period of five months, 34 cavalry officers and 2 officers from the foot artillery regiment No. 2; for a period of nine months, 63 noncommissioned officers and 20 reenlisted men from the cavalry.

The officers' course lasts from January 4 to May 31, and that of the enlisted men from October 1 to June 30.

After graduating from the school of telegraphy the enlisted men are classed according to the marks obtained as cavalry telegraphers or assistant cavalry telegraphers.

The school is dissolved when mobilization takes place.—*Revue du Cercle Militaire, August 17, 1901.*

NEW MILITARY TECHNICAL SCHOOL.

The military budget for 1901–02 states the following with regard to a new school:

Exigencies of modern warfare demand a greater knowledge in the army of such technical sciences as are of importance for military purposes. Questions concerning steam power, electricity, mechanics, construction of buildings, roads, and bridges, means of communication, erection of manufactories, and installation of machines, arise every day. The scope of technical sciences is too large to be included in the program of instruction of the military academy, which is mostly a military scientific institution.

In addition to the diffusion of technical knowledge in the army at large the technical school is to prepare officers of troops of communication and technical institutions, also those studying for the corps of engineers. The school will be located partly in the joint artillery and engineer school at Charlottenburg, and partly in a new edifice constructed for this purpose.

The school is intended for 200 officers. The program consists of three courses, each lasting one year. The third class is to be composed of 100 officers, 50 of which pass to the second class and later on to the first.

The inauguration of the school will take place on October 1, 1902; the director and adjutant, however, must report there on April 1, 1902. The member of the board who is to assist the director will enter upon his duties on July 1, 1902, and the professors on October 1, 1902.

The rest of the personnel will be placed on the rolls in the course of 1903 and 1904. The expenditure expected from October 1, 1904, is calculated at $31,250 a year.—*Allgemeine Militär-Zeitung, December 21, 1901.*

SIGNALING.

Instructions for signaling recently introduced in the army have been published. The system is based upon an apparatus closely resembling that of railways, i. e., a post provided with mobile arms. The alphabet is formed by the combination of the various positions of the arms.—*Revue Militaire Suisse, November, 1901.*

TRANSPORTATION OF MEN IN CASE OF MOBILIZATION.

An appendix to the regulations concerning the transportation of troops of January 18, 1899, which until now has been kept secret, was recently published. We give the résumé of it below:

According to the prescriptions of this appendix all the German railways using locomotives or other means of traction are obliged during the period of mobilization to transport gratuitously and without presentation of tickets all the men of the land and naval forces, as well as those of the landsturm called to the colors.

The reserve and landwehr men, in order to be admitted into the train, must present their orders. Those belonging to the landsturm have only to make a verbal declaration that they belong to the landsturm and that they have been called to the colors. The volunteers during the time of war and the volunteers of the landsturm must present certificates from the local authorities stating the purpose of their journey.

The railway companies receive for this service in case of mobilization a certain sum calculated at the war ministry according to the number of men which in conformity to the plans of mobilization must be called to arms. The first half of the sum shall be paid to the companies on the 20th day of the mobilization and the other on the 30th.—*Revue du Cercle Militaire, May 4, 1901.*

NEW TENDENCIES IN THE GERMAN ARMY.

An article under the title "Les tendances nouvelles de l'Armée Allemande," has appeared in a recent number of the Revue des Deux Mondes, which has excited much attention abroad, especially in Russia, where it has been translated by General Puzyrevski, of the Warsaw district. An article on the same subject, which appeared in the Russki Invalid, ends with the following conclusions:

1. On account of the rapidity of mobilization, long range of guns, smokeless powder, and masses of cavalry forming a screen, it will be exceedingly difficult to guess the dispositions

and the intentions of the enemy, and to direct one's reserves, in sufficient time, to where they will be needed. To avoid this difficulty, the best plan is to take the initiative oneself in order to force the enemy to throw light on the situation. From this rises the incessant propaganda of German military writers in favor of the offensive at all costs.

2. Full use should be made of the range and rapidity of fire of firearms. For this purpose it becomes necessary to place in line the largest proportions possible of the fighting force and consequently to increase considerably the length of frontage hitherto thought sufficient. Thus, company and battalion reserves will exist only at the beginning of an action, and will disappear progressively and entirely into the line of skirmishers before the enemy is clearly seen.

3. As a consequence of the rapidity of artillery and infantry fire, the results of that fire will be very promptly obtained, and consequently reserves, if kept at a great distance in the rear of the fighting line, will have no time to get into action. The battle will, therefore, be carried out by divisions, formed into a line of skirmishers, regimental and divisional reserves. There will no longer be any army corps or army reserves. The army, in the contact zone with the enemy, will advance across the country, for the greater part of the time, in line of division or brigade columns. In those areas where formerly army corps or army reserves were placed, the division columns will be brought closer together to concentrate the fire of guns and rifles. The effect produced is the same as if the intervals of the fighting line had been reenforced by units which formerly constituted the army corps and army reserves.

4. The role of these former army corps and army reserves will in future be played by those divisions which, in accidental encounters, such as will most probably take place, are farthest from the field of battle. Army and army corps commanders should direct them in their column formation and should keep them for enveloping or turning movements or for piercing the enemy's line. Or commanders of these divisions themselves, acting on their own initiative, will march to the sound of the guns, and, preceding their troops, will reconnoiter the situation in order to intervene at, where they consider, the most favorable spot. Divisions opposed by an enemy in superior strength will remain, provisionally, on the defensive. Instead of reenforcements, ammunition will be sent them in

order that they may be able to increase the intensity of their fire.

5. Masses of cavalry will also occasionally make up for the deficiency of the army corps and army reserves. They may be kept screened from fire and hurled rapidly to the front at decisive moments.

6. This process will often be most advantageous and may result in brilliant victories. As a rule fierce fire is generally immediately followed by a bayonet attack, because the enormous expenditure of ammunition does not allow of a prolonged fire, and a pause between the fire and the attack is not advantageous. The reserves which deliver the attack should, therefore, be close at hand. The Germans themselves recognize the danger of such headlong attacks, but they consider that the excellent composition of their corps of general officers, who have been carefully trained to take the initiative, gives them the right to hope that they will carry out such charges only when they think they have every chance of success.

7. The defensive will always partake of an active character, and in that case will probably always have strong reserves.

8. There is nothing new on the subject of strategic reserves. There is, therefore, every reason to believe that in future every available man will be brought on the battlefield.

Such are the conclusions drawn by the author of the article in the Russki Invalid from his study of German maneuvers and German authors. The question summed up is as follows:

The efficacy of fire and the depth of columns oblige the reserves to be kept well in the rear. On the other hand, owing to the rapidity and efficacy of fire, the attack develops rapidly, and therefore the reserves must be quite close up. To reconcile these two extremes the Germans place all their reserves at once into the firing line and try to mass their cavalry in close proximity. By arming the latter with an automatic pistol they will be able to increase its power, as the cavalry will fire from horseback. However that may be, the Germans rely, above all, on the qualities of their higher commanders, whom they judge superior to those of their neighbors, and on their qualities of initiative and of pressing the offensive to the uttermost possible limits.—*Journal of the Royal United Service Institution, January 15, 1902.*

Plate IV.

GREAT BRITAIN.

THE BLOCKHOUSE SYSTEM IN SOUTH AFRICA.

The accompanying chart is intended to illustrate the present military situation in South Africa so far as the distribution of the enemy and the progress made in the blockhouse system are concerned. In order that the situation may be better emphasized, the areas in British and Boer possession have been distinguished by making a variety in shading on the face surface of the map. Thus the lighter and horizontal shading is intended to mark areas which have been practically cleared of the enemy; in which few supplies and no large concentrations of Boers are to be found. In such areas it would be possible for small patrols to traverse the country without running across bands of the enemy of greater strength than themselves. The areas which have been totally cleared and in which it is possible for single horsemen to move without immediate fear of molestation are shown on the chart in white. But even in these areas, which for the most part are those which have been inclosed by Lord Kitchener's blockhouses, Boers occasionally will be found who have successfully run the blockade of the defensive posts; but their presence is, of course, a contingency which is becoming rarer every day. The shading with close diagonal lines depicts the areas to which the Boer resistance is now mainly confined. As will be readily seen, these areas are sections of the theater of war which are richest in supplies drawn from the Kaffirs; are more remote from our railway system, and present the greatest topographical difficulties to the movement of our columns. But, although for the sake of comparison it has been found expedient to show them in heavier shading, it must not be inferred that these areas are of necessity in the undisputed possession of the enemy. They have been crossed and recrossed by our columns, but in spite of this the enemy has invariably returned to them. It is within these areas that the enemy can concentrate in sufficient force to overwhelm any British column that is not at least of the strength of 600 to 700 men. To make a better illustration of the idea embodied in the chart it may be supposed that an officer is attached to a column operating in the Ermelo-Carolina-Amsterdam triangle. He receives a heliogram which informs him that he has been given an appointment in Johannesburg.

He determines, for reasons that are immaterial here, to travel as far as possible by road. His column is at Amsterdam. Much as he may desire to push on, he is obliged to remain with his column of 700 men until, moving westward, it strikes the line of blockhouses connecting Ermelo and Standerton. From here, still traveling by road, he is able to push on with the small escort to a convoy which is to ration one of the blockhouse sections on the Waterval River–Steenkolspruit chain. West of this line the country has been absolutely cleared, and the officer, mounting his pony, is able to ride alone to Springs, where he takes a train to his destination.

This clearance of the country and the restriction of the enemy to given and known areas are the direct outcome of Lord Kitchener's blockhouse system. In the chart it has been attempted to show by means of crosses the system of ramifications from given centers, in which the blockhouses have been employed in the general scheme of pacification and clearance. By a careful study of all the recent information to hand it has been possible to arrive at an approximate result which more or less clearly depicts at a glance the remaining energy of the Boers, and the progress of the means which have been adopted for its ultimate subjection. In the first place, the extension of the blockhouse system, so far as it has been officially reported, is substantially correct in the chart. There may be other extensions, in contemplation or in the course of construction, but as they have not yet been reported officially it has been impossible to locate them with any degree of accuracy. But it is fair to conjecture that in the Orange River Colony the Boshof–Kimberley line will connect with Smaldeel; that the extension from the east of Kroonstad will, via Lindley, ultimately link up with Harrismith; also, that in the Transvaal the system of parallels east of the Pretoria–Vereeniging line will be pushed forward until it is impossible for the area north of Ermelo, marked in our chart with diagonal lines, to exist as a Boer rendezvous.—*London Times*, *December 25*, *1901.*

The construction of the blockhouses is very simple: Sand and gravel are piled between two walls of sheet iron. Such a wall is bullet-proof, but might be very easily destroyed by artillery. The Boers, however, do not possess any artillery at present. The garrison of half these fortifications consists generally of seven or eight men, composed of a chief of the post and Kaffirs (which shows that the British enlist the natives). The other half is garrisoned by Europeans alone of a similar number of men. The whole force is 25 battalions.

On many occasions the Kaffir garrisons of these blockhouses have taken flight without firing a single cartridge. Moreover, these blockhouses are reenforced only by mobile columns which are neither very mobile nor very dense. In order to defend the railway lines it was necessary to increase the numerical strength of the garrisons of these posts. The destruction of the railways was rendered more difficult, but as yet it is not impossible, as proved by several cases. However, the commands crossing the line are always reported, which is an advantage.

These blockhouses absorb about 20,000 men. The price of construction and the pay of the natives have not been mentioned, but the expense must have been considerable.

The employment of the Kaffirs for combat must be insisted upon. At the beginning of the war it was understood by the adversaries that none of them would have recourse to their dangerous services. Ten times as numerous as the whites, they may get the habit of war and pillage, and they are already predisposed to the latter.

Some time ago General Viljoen had surrounded and made prisoners in a fort on Crocodile river 23 white soldiers forming the cadre of a troop of Kaffirs. According to the rules of international law, he had the negroes shot. He then asked Kitchener if he considered the whites who fought side by side with the negroes as marauders or if he claimed them as soldiers of his. In the latter case he would treat them as prisoners of war. Lord Kitchener answered, in writing, that he considered them as soldiers of the regular British army. The letter of General Kitchener, constituting an authentic document, is, according to the Agence Paris-Nouvelles, in the hands of the Boer government.—*Reported by Capt. T. Bentley Mott, Artillery Corps, United States Military Attaché at Paris.*

CYCLISTS FOR SOUTH AFRICA.

A company of volunteer cyclists, mobilized at Aldershot, was sent on May 10 to South Africa. This company consists of 4 officers and 130 men.—*Revue du Cercle Militaire, May 11, 1901.*

THE CYCLIST INFANTRY OPERATIONS AT ALDERSHOT.

The five days' cyclist infantry experimental operations at Aldershot which came to a close on Friday last, and had been carried out under the direction of Maj. Gen. C. W. H. Douglas, were a great success and an instance of really well-conducted military training. The operations must have convinced the most skeptical that the bicycle has in it great potentialities as a form of transport for infantry in large bodies; and the work done has shown also the difficulties which exist and must be overcome before the bicycle can be so used. It has, further, brought out the need for much more experiment before we can decide what are the best ways of moving a column of cyclists, as regards pace, distances, and other elementary matters connected with marching.

The force consisted of a small brigade of some 1,100 cyclists, constituted in three battalions, each with four companies of unequal strength. All the companies except two were composite, being formed of the cyclist sections of different battalions. It was possible with this inequality of numbers to obtain information as to the best strength of a cyclist company for control and command. At the present time a large number of volunteer battalions have either a cyclist company or a cyclist section. In the event of these battalions being mobilized for home defense—and it is only home defense that the operations have in view—these cyclists would be of very little value, if they remained with their battalions; but if collected they would form battalions of extra-mobile infantry, and could be rapidly transferred to any point where their services might be required, and the transference would be independent of the railways—they would move themselves. The chief among the many factors which affect the movement of cyclists in large bodies is the weather, in which word must be included rain and the strength and direction of the wind; the effect of the weather on the roads and the character of the road and its gradients are potent influences. It is the absolute dependence of cyclist locomotion on these considerations that renders it almost impossible to lay down, as can be done with other forms of locomotion, either rates of marching or the distances a cyclist force can be relied on to cover in a given time. As the operations were really the first experiment of moving cyclists in a mass, it was as well, perhaps, that the weather and the roads were in every way favorable. This was also fortunate, inasmuch as the riders were not in condition for hard work, and, moreover, the bicyles, being the private property of the riders, were not suited for military requirements. The number of punctures was very considerable, but this was due to the fact that the tires were of a very ordinary character; the volunteer does not buy for his own use an expensive machine, and it was the less expensive machines that were ridden at the operations. General Douglas, in his admirable Instructions for Cyclist Corps, 1901, drawn up for these operations, specified no fewer than eighteen "points" respecting which information was to be obtained, but as these did not include the knotty question of the "free" wheel, the tire, or the attachment of the rifle, the number of "points" is probably some twenty-five at least.

The five days' work elicited the fact that on hardly any one of these points is there at present any unanimity of opinion. Even as regards the normal rate of marching opinions vary from the rate of 10 to that of 7 miles an hour; 6 miles an hour was tried, but was found to be too wearisome for the riders. What distances should be preserved between the units, and how the orders of the commander should be communicated and transmitted along a column, are unsolved questions even after five days' trial. The best method of loading the machine and the amount of ammunition the cyclist should carry on it were necessarily left untouched; and these questions can hardly be determined until experiments have shown what is the best form of bicycle for military work. Every extra pound of weight, either in the machine itself or on the rider, tends to lessen the mobility and also to fatigue the men. The operations were mainly march operations—on the first day those of companies and battalions for short distances. On the second day there was a march of about 38 miles along an admirably selected road with easy gradients. In the course of the march the column had to pass an artificially formed obstacle on the road by a gap about 4 feet wide. The column always marched in files, but some 50 yards short of the gap the order was given to form single file, and a staff officer shouted to them to "scorch," with the somewhat paradoxical result that the gap was cleared by the column in two-thirds of the time the column had taken to pass a given point on the ordinary march. On the following day there was a march of about 32 miles, for the most part over hill and dale, from Ash

(235 level) up to Hindhead (nearly 900 level) and down to Woolmer (300 level); a portion of the force marched by a distant parallel road out of sight, and communication was maintained not only by cyclists but by motor cars. The motor, whether bicycle, tricycle, or car, is a necessary accessory in cyclist operations, both for the conveyance of the commanding officer and the staff and also for use by orderlies. The automobile club had most courteously responded to the request of the military authorities to help with their private cars, and the Hon. C. Rolls, and Messrs. Weir, Mayhew, and Kenealy were the charioteers on this occasion. But, as is the case with the bicycle, the best motor for military use has yet to be devised. The ideal car must be of little width, so as to occupy as little of the road as possible; but with cyclists on the march any motor is a source of danger to the troops, and needs most careful handling. On the night Thursday–Friday was a short march of 13 miles; but very little of it took place during anything like an approach to darkness, and in consequence very little useful information on this branch of the subject was obtained. Cyclists will have to be very well trained on day marching before they can be trusted to undertake a real night march. At night the difficulty of transmission of orders along a column, whether an order to increase the pace, to halt, to slow down, or of a message as to the position of the rear or head of the column is far greater than during the day; and how best to manage these things in broad daylight has not yet been satisfactorily settled. On Friday the corps acted as the right-flank column of a large attacking force on a field day on the Fox Hills. Unfortunately, a message miscarried owing to the breakdown of the motor carrying it, so the corps did not move off as early as had been intended. Had everything gone well the value of the cyclist mobility would have been proved by the sudden and unexpected appearance of these 1,200 infantry, not only on the flank but also on the line of retreat of the defending force. Very little opportunity was found for ascertaining the possibility of the cyclist's regaining his mount after fighting as an infantry soldier, but what little was found seemed to indicate it is quite possible that in the defense he may readily remount, but that in the attack he can never use the wheel for pursuit.

The net result of the experiment, coupled with those in Sussex and Essex, shows that cyclist infantry can be of great value as a factor in the defense of this country, but before it can attain efficiency in this respect there must be much training and, further, much consideration of details. There is no need to wait until the next maneuvers for the next experiments. Cyclist companies and sections can work these out at their own homes, provided the military authorities at once lay down principles for their guidance. General Douglas is engaged in drawing up an exhaustive report on the operations, and it will, no doubt, be found not only a full statement of the various views held on the five-and-twenty points, but also an unprejudiced and enlightening expression of opinion on each.—*London Times, August 15, 1901.*

NEW STANDARDS OF HEIGHT OF RECRUITS.

An army order announces the following new standards of height of recruits for the corps of dragoons and hussars of the line: Corps of dragoons of the line—under 20 years of age, 5 feet 5 inches to 5 feet 7 inches; 20 years of age and over, 5 feet 6 inches to 5 feet 8 inches. Corps of hussars of the line—under 20 years of age, 5 feet 2 inches to 5 feet 5 inches; 20 years of age and over, 5 feet 4 inches to 5 feet 6 inches.—*The Army and Navy Gazette, September 14, 1901.*

WAR DOGS.

The Army and Navy Gazette states that war dogs have been exhibited at the naval exhibit at the Crystal Palace. These dogs have been trained according to the German method. They can be used for the following services in the field: To keep up communications between the various units of an army corps, to watch at the advance posts and carry messages especially at night, to carry ammunition to the firing line, to prevent sentinels from being surprised during the night in sieges and investments, and to find the wounded during battle.

The above-mentioned periodical expresses the hope that these dogs will soon be adopted in the English army.—*Rivista di Artigleria e Genio, September, 1901.*

WATER CART.

The Army and Navy Gazette of March 16, 1901, mentions a new water cart patented by Lord Dundonald in which the wooden barrel is replaced by one of metal, zinc or aluminum, the latter preferred, and of a cylindrical shape.

One advantage of the metal barrel is that it can be removed from the carriage, placed over a camp fire and the water brought to the boiling point, thereby destroying all germs. Another advantage is an orifice in the bottom as well as at the top, thereby permitting water to run through for flushing and cleansing purposes.—*London Times, 1901.*

CARRIER PIGEONS.

Such excellent results were obtained during the earlier stages of the South-African war from the employment of pigeons as dispatch bearers that the war office has established a training station for the purpose at Aldershot.—*United Service Gazette, March, 1901.*

WAR OFFICE ADMINISTRATION—NEW ORDER IN COUNCIL.

The following new order is taken from the London Gazette:

At the Court at St. James's, the 4th day of November, 1901.

I.—Duties of the commander in chief.

The commander in chief shall exercise general command over His Majesty's military forces at home and abroad, shall issue army orders, and hold periodical inspections of the troops.

He shall be the principal adviser of the secretary of state on all military questions, and shall be charged with the control of the departments of the adjutant general, director general of mobilization and military intelligence, and military secretary, and the general supervision of the other military departments of the war office.

He shall be charged with the general distribution of the army at home and abroad, and with the selection and proposal to the secretary of state for war of fit and proper persons to be recommended for commissions in the regular forces, and of fit and proper officers, whether of the regular or auxiliary forces, for promotion, for staff and other military appointments, and for military honors and rewards.

In the absence of the commander in chief the senior officer of the headquarter staff shall act for him.

(*a*) THE ADJUTANT GENERAL'S DEPARTMENT.

The adjutant general shall be charged, under the control of the commander in chief, with the discipline, military education, and training of the officers, warrant officers, noncommissioned officers and men of the regular and reserve forces, militia and yeomanry of the United Kingdom, and of the volunteer force of the United Kingdom when subject to military law or when assembled for training, exercise, inspection, or voluntary military duty.

With matters relating to the general efficiency of the army, and the effective strength of its units.

With the allocation of the troops to their respective duties.

With patterns of clothing and necessaries, and with the maintenance of returns and statistics connected with the personnel of the army.

With enlisting men for, and discharging men from, the regular and auxiliary forces.

With annually submitting proposals to the commander in chief for the establishments for all of the above services.

(b) THE DEPARTMENT OF THE DIRECTOR GENERAL OF MOBILIZATION AND MILITARY INTELLIGENCE.

The director general of mobilization and military intelligence shall, under the control of the commander in chief, be charged with the preparation and maintenance of detailed plans for the military defense of the empire and for the organization and mobilization of the regular and auxiliary forces.

With the preparation and maintenance of schemes of offensive and defensive operations; the collection and distribution of information relating to the military geography, resources, and armed forces of foreign countries, and of the British colonies and possessions.

(c) THE MILITARY SECRETARY'S DEPARTMENT.

The military secretary shall, under the control of the commander in chief, deal with appointments, promotions, and retirements of officers of the regular and auxiliary forces, the educational qualifications required from candidates for commissions in the army, and is charged with the administration of the educational establishments.

II.—The quartermaster general's department.

The quartermaster general, under the supervision of the commander in chief, shall be charged with supplying the army with food, forage, fuel, and light, and quarters, with land and water transport, conveyance of stores, and provision of remounts; with the movement of troops, and with the distribution of their barrack stores and equipment; with administering the army service corps, the pay department, the veterinary department, and the establishments employed on the above services. He shall submit proposals for the annual estimates for the above services, and shall advise the secretary of state on all questions connected with the duties of his department. He shall make such inspections as may be necessary to secure the efficiency of the services under his control.

III.—Department of the inspector general of fortifications.

The inspector general of fortifications shall, under the supervision of the commander in chief, be charged with the selection of sites for barracks, ranges, and maneuvering grounds, with the construction and maintenance of fortifications, barracks, and store buildings, and the inspection of ordnance factory buildings and engineer stores; with military railways and telegraphs and engineer stores; with the purchase of land and the custody of war office lands and unoccupied buildings; with advising as to the design and issue of royal engineer and submarine mining stores. He shall submit proposals for the annual estimates for engineer services, including engineer stores, and shall advise as to the general distribution of the corps of royal engineers, and as to the appointment of officers to, or their removal from, responsible positions in connection with works. He shall advise on all questions relating to the technical instruction of the corps of royal engineers, and shall make such inspections as may be necessary to test the professional training of officers and men of the corps, and to secure the efficiency of the services under his control. He shall advise the secretary of state on questions connected with the duties of his department.

IV.—Department of the director general of ordnance.

The director general of ordnance shall, under the supervision of the commander in chief, be charged with supplying the army with warlike stores, except engineer stores, equipment, and clothing; with the direction of the ordnance committee and manufacturing departments of the army; with dealing with questions of armament, of patterns of inventions and designs, and with the inspection of all stores, except engineer, medical, and veterinary stores, whether supplied by the manufacturing departments or by contractors. He shall administer the army ordnance department and army ordnance corps, and shall make such inspections as may be necessary to secure the efficiency of the service under his control. He shall submit proposals for the annual estimates for the above services, and shall advise the secretary of state on questions connected with the duties of his departments.

V.—Department of the director general, army medical department.

The director general, army medical department, shall, under the supervision of the commander in chief, be charged with the administration of the medical establishments of the army and of the royal army medical corps; with dealing with sanitary questions relating to the army; with the preparation of medical and sanitary statistical returns, and with the supply of medical stores to the army. He shall advise the secretary of state as to the general distribution of the royal army medical corps, as to the appointment of officers to, or their removal from, responsible positions therein, and on all other matters connected with this department. He shall make such inspections as may be necessary to insure the efficiency of the services under his control, and shall submit proposals for the annual estimates for the medical services.

VI.—The financial secretary's department.

The financial secretary shall be charged:

With financially reviewing the expenditure proposed to be provided in the annual estimates for army services, and with compiling those estimates for submission to Parliament.

With financially reviewing any proposals for new expenditure, or for any proposed redistribution of the sums allotted to the different subheads of the votes for army services.

With seeing that accounts of all expenditure of cash and stores are correctly and punctually rendered; with auditing and allowing all such expenditure, and recording the same under its proper head of service in the annual account of parliament; with issuing all warrants for the payment of moneys; with making all imprests to accountants and others.

With the financial control of the manufacturing department of the army, and with controlling and recording all contracts for army services.

With advising the secretary of state on all questions of army expenditure.

—*London Times.*

SUPPLIES AND TRANSPORTS OF THE ENGLISH ARMY IN SOUTH AFRICA.

One of the most interesting and instructive chapters of the South-African war is that treating on the masses of supplies sent there and the means of transportation employed, combined with the enormous distance of the theater of war and the great number of troops which England is forced to maintain on the spot. One glance suffices to show that the figures of the supplies exacted by the English army are such that it is difficult to realize their magnitude. The base for supplies was a depot organized for four months and calculated to provide for 116,000 men and 51,000 horses, and during that time, as stated by the Norwegian Maj. Oscar Nielsen in the Aftenposten, the depot issued 13,277,000 pounds of tinned meat, 13,277,000 pounds of hard tack, 440,924 pounds of coffee, 220,462 pounds of tea, 220,462 pounds of sugar, 881,848 pounds of pressed vegetables, 220,462 pounds of cooking salt, and 360,000 cans of condensed milk. An important article of supply of the British troops in South Africa is the yam, which has been used in many wars and which is both an excellent article of food and a preventive against scurvy. There were no less than 1,598,350 pounds of this article in boxes containing from 2.2 to 4.4 pounds each in the depot. Another article of food consisted in a mixture of meat and boiled vegetables, of which one contractor furnished not less than a half million boxes.

The depot contained 681,120 quarts of rum, 12,000 bottles of whisky, 32,000 bottles of port, about 440,924 pounds of lemon juice, and a mass of apparatus for the manufacture of soda water.

With regard to tobacco, in addition to offerings sent by private persons, there was for a period of four months 44,092 pounds, which constitutes an enormous mass, but the English soldier is an inveterate smoker and takes advantage of every opportunity to light his pipe. The actual consumption of tobacco during one to two years is calculated to amount to about 264,555 pounds; this amount is valued in London at $291,000.

There was on hand for the purification of doubtful well and river water 80 tons of alum; and of disinfectants 6,614 pounds of carbolic powder, 20 tons of chlorid of lime, and 10 of McDougall disinfecting powder. There were also 8,819 pounds of candles for lighting.

The transportation of supplies to the base and thence to the troops required a great number of horses, mules, and oxen, as well as wagons, and the acquisition of these was one of the great difficulties which the British intendancy had to meet. The sixth division alone, which reached the Cape in the beginning of 1900, required 744 horses and 2,000 mules, although this division consisted only of 8 battalions, 3 batteries, 1 company of pioneers, 3 supply columns, 3 field hospitals, and two litter-bearer companies. The eighth division required 1,548 horses and 2,505 mules.

General Buller had on the upper Tugela a train of 400 wagons and 5,000 oxen, as well as numerous mules. These had been bought by British officers and veterinarians in America, Spain, and Italy; 31,503 mules were shipped on 33 steamers, a total of 134,754 registered tons, from Naples, Gibraltar, and New Orleans.

Between July 1, 1899, and March 31, 1900, 191 steamers, a total of 1,068,812 registered tons, were employed for transportation, not including 25 vessels that likewise transported troops and war material but were not entirely chartered by the government. A total of 6,663 officers, 170,185 privates, and 33,101 horses were transported from England. The average duration of the journey was twenty-two and one-half days.

Forty-nine steamers, with a total tonnage of 177,417, were used to transport troops from India to South Africa. On these were shipped 417 officers, 13,274 men, 7,344 horses, and 1,150 mules. The average duration of the journey was seventeen days.

From the remaining colonies were transported on 29 vessels a total of 152,397 registered tons, 486 officers, 8,630 men, and 7,342 horses. For the transportation of 13,596 horses from Australia, Argentina, and New Orleans, 14 steamers, a total of 102,696 registered tons, were chartered.

For the transportation of all kinds of war material, troops, horses, and mules to South Africa there had been chartered 306 steamers, with a total tonnage of 1,738,078. These steamers transported 7,566 officers, 192,089 men, 61,383 horses, and 32,653 mules in 351 trips.

As previous experience had shown that the ordinary wagons could not be used in South Africa, officers were sent to America to order wagons made after a model used in South Africa. They were, however, forced in the end to buy wagons in South Africa, as well as manufacture 1,000 of them in England; this is why the conditions of transportation were so difficult during the first months of the war.

Up to General Buller's operations on the upper Tugela and Lord Roberts's advance into the Orange Free State, the troops had to rely, for their supplies, on the railways. Yet Lord Kitchener and General Buller succeeded in obtaining from the camps of Chiveley, Modder River, and De Aar, such a number of wagons that General Buller could continue his operations on the upper Tugela and Lord Roberts could march against Bloemfontein and relieve Kimberley.

General Buller was, however, forced, on account of the difficulties encountered in transportation, to construct a narrow-gauge railway to Springfield, and at the same time to employ eight road locomotives sent from England, before he could continue his advance from Chiveley and Frere.

On account of the great losses in draft animals from pest, the tsetse, and the pinkeye, it was impossible to count upon a regular service of transportation by animal traction, and therefore many experiments were made in England with road locomotives, which were crowned with very satisfactory results. While with animal traction the transportation of 20 tons necessitated 20 wagons, 90 horses and 48 men, and 984 pounds of forage, the same amount could be transported by a road locomotive with the consumption of 573 pounds of coal and the service of one machinist and one fireman. With animal traction the amount mentioned above could be forwarded 5½ miles per day, while the road locomotive could forward it 12 miles per day. This auxiliary measure was of great assistance in the beginning, though later on it apparently did not fulfill all the expectations, so that the employment of road locomotives in the field is of rather doubtful utility.

The greatest difficulty in the use of these means of transportation was presented by the water problem. The locomotive could, it is true, take along a supply of water for a stretch of 20 English miles, but after that the boilers had to be provided with fresh water, a thing fraught, in some places, with great difficulties. The expenditure of water on a stretch of 15 English miles amounted to about 5,000 pounds.

Exclusive of the eight road locomotives, General Buller's train consisted of 4,000 wagons, most of them ox carts, and 5,000 draft animals, and occupied a stretch of 19 miles. The difficulties of transportation were often increased by the wagons and machines sinking into swamps up to the axles, so that double and triple teams were necessary to pull them out.

From the comparison made between the wars waged by England across the ocean and the war in South Africa it may be seen that General Buller curtailed the supplies as far as possible and carried along only what was absolutely indispensable for his troops. When General Nott began his advance from Kandahar to Kabul in 1842 his train column counted 10,000 camels and numerous draft animals, while his whole effective strength consisted only of 7,000 men. General Roberts, when he marched to the relief of Kandahar, used also 10,000 camels, although he had rendered his train as small as possible; during the last campaign against the Indian mountain tribes an army of 17,000 men required 24,000 camels. Had General Buller acted according to Indian examples his train column would have taken up a stretch of 37.9 miles instead of 19.—*Neue Militärische Blätter, May 1, 1901.*

BRITISH ARMORED TRAIN USED IN CAMPAIGN AGAINST THE BOERS.

The consist of armored train No. 1 of the British army in South Africa is shown in plate:

It is composed of a locomotive, with all its most vulnerable parts protected, and seven trucks and coaches. The motive power, naturally, is placed in the center of the train, the "fighting" portions, for reasons that are obvious, being at both ends. The train consists of two protected bogies equipped with Maxims, or "pompoms" and loopholed for infantry. Then next to one of these trucks is attached a bogie upon which two 12-pounder quick-firing guns are mounted, which allows of a traversing fire of about 135 degrees on either side of the train—that is, approximately 270 degrees out of the possible circle. This is to be improved upon, but it entails specially constructed trucks. The rest of the train is made up of the officers' coach and trucks containing the electric and telegraph apparatus, dynamo, and construction material.

In addition to the actual armored train a number of protected and loopholed trucks have been made, which, manned with infantry, can be taken out by the armored train and dropped at convenient spots along the railway—at wagon crossings and like frequented communications. Thus it is possible to sow a length of line with stationary forts which form points for the armored trains to patrol between. But possibly the most important factor of armored-train patrolling is the facility of intercommunication between the trains and the various headquarters of intelligence. The train has but to halt and, if the telegraph wires are intact, it is in communication at once with every station down the line. It takes just thirty seconds to tap the wires and get the "buzzer" working. Then by means of the phonophore each train on the beat is in communication as soon as it halts with other stationary trains. The value of this can be appreciated. When a section of the line is under observation, the trains, for economic reasons, are not patrolling all night. Do what you may, a steam engine is not a silent scout and has a ravenous thirst for water. They lie quietly secreted at some strategic point, prepared to concentrate or divide on the call of the "buzzer." The intelligence officer at some center receives information

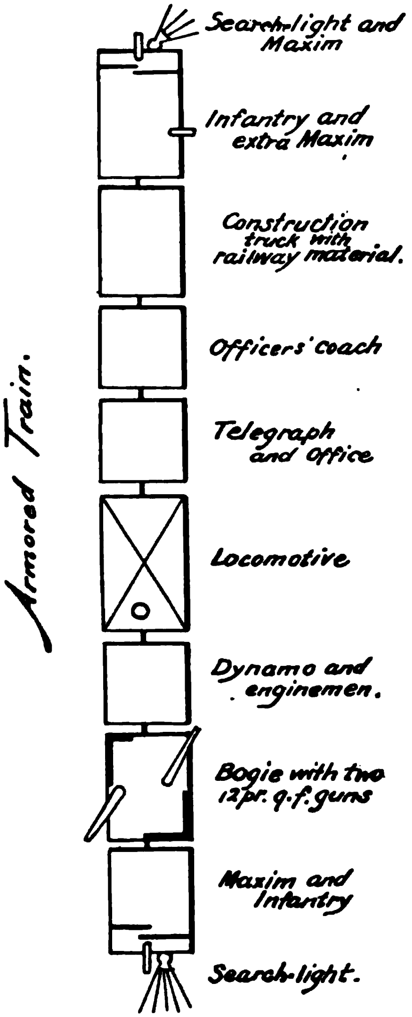


Fig. 29.

from his native scouts that the enemy is moving upon a certain point on the line. He calls up the officer commanding the nearest armored train, and in five minutes every train on the beat, if necessary, is concentrating upon the probable theater of action.

The "crew" of an armored train—or garrison, if the term better commends itself—is small—29 rifles, which include 8 sappers for reconstruction and search lights, 3 telegraph operators and wire men, 4 royal engineers' firemen and drivers, 2 officers' servants, and 12 infantry men. This, with the 2 officers and 10 gunners to work the guns and Maxims, makes the fighting complement. Whenever the train is in motion, there is an officer on watch in the forward and rear batteries.—*London Times, June 24, 1901.*

ITALY.

WINTER EXERCISES OF THE ALPINE TROOPS.

The winter exercises of the Alpine troops have given remarkable results. Separate units have ascended heights over 2,000 meters above sea level. They bivouacked there during a severe cold in deep snow which in one case covered the ground about 1½ meters. Two different methods were used, i. e., the erecting of double tents with lining of straw for three men each and the digging out of shell-like cavities in the snow in which the walls had been made as thick as possible by stamping and ramming. When the temperature was about +9.5° F. outside, the thermometer showed +27.5° F. in the caves and +20.75° F. in the tents. The men were supplied with wood and straw and received both coffee and rum as extras. No sickness took place. It was the first time that snowshoes had been experimented with by the third regiment at Clavieres and by the fifth at Splugen. The experiments gave satisfactory results and will be continued.—*Militär-Wochenblatt, May 1, 1901.*

NEW TRAINING OF INFANTRY.

A new mode of infantry training, the so-called "Parma method," originated in the central infantry firing school of Parma, is to be introduced into the army with the enlisting of the recruits born in 1880. The new method, adopted in place of the German one, which was not suited to the Italian temperament, consists mainly in extensive gymnastics and games replacing most of the drills. This method has already been tested in a regiment stationed in Florence and has met with great success. The recruits, immediately upon their arrival, are made familiar also with the handling of the rifle. Firing exercises are as early as possible made to alternate with the other exercises. Great diversity, short of fatigue of instructors and recruits, is the characteristic feature. The new method, however, has in army circles many opponents. These maintain that, although the above-mentioned regiment, trained according to the Parma method, was equal to any other in closed formation, parade march, discipline, etc., and even superior to others with regard to mobility and fighting capacity, a thorough training and the awakening of true military spirit can not be attained by the Parma method. It is claimed that the exclusion of close-order drill ought not to be carried too far, as unconditional obedience, the corner stone of all thorough training of troops, can be attained only by such exercises. Yet the new military experiment made by Italy presents some interest to the other powers.—*Armeeblatt, April 3, 1901.*

NEW EQUIPMENT AND ARMAMENT OF CAVALRY.

The Italia Militare e Marina states that, by order of the war minister, new equipment and armament would be experimented with by the fourth cavalry regiment stationed at Milan. One squadron has received a new type of overcoat instead of the old cape. Another squadron is experimenting with new leather gaiters with buckled spurs instead of the former spurs, which were attached to the heel of the boot. One troop is fitted out with a new saber attached to the belt by means of two rings and similar to the model worn by the officers. Another troop is experimenting with bamboo lances instead of the ordinary wooden ones.

At the same time the former cavalry train wagons have been discarded and those of German model adopted.—*Internationale Revue über die gesammten Armeen und Flotten, April, 1901.*

JAPAN.

ARMY OFFICERS ABROAD.

The war department details officers abroad for the observation of military affairs in the west. The number is kept at thirty. The term for each officer is three years.

They are sent mostly to England, France, Germany, Russia, and Austria-Hungary. This year ten officers are coming back from Europe in March, on the expiration of their terms, and the same number of new officers will be sent out immediately after their return. According to the regulations of the department, an officer is allowed to go abroad for the prosecution of his studies at his own expense, while retaining his rank as usual. But since this regulation was made, not many officers have applied to the department for permission to cross the water at their own expense.—*Report of Maj. O. E. Wood, Artillery Corps, United States Military Attaché at Tokyo.*

USE OF BICYCLES IN THE ARMY.

The Japanese army is not behind the European armies with regard to the employment of bicycles. The Russian paper Viestnik Inostrannoy Literaturi says that a detachment of 30 cyclists, commanded by Captain Uzava, has recently made a long and interesting excursion during which the men practiced reconnoitering service and transmission of orders. The cyclists rode bicycles bought in Belgium by Prince Kanin in 1900.—*Revue du Cercle Militaire, July 13, 1901.*

MEXICO.

DAILY RATIONS OF THE MEXICAN SOLDIER WHILE ON GARRISON DUTY.

The following table represents the daily ration of the Mexican soldier as decreed by the secretary of war.

The decree states that 12 cents per diem shall be deducted from each soldier's pay for the said rations.

Breakfast.

	Grams.
Coffee for 160 grams of water	9
Bread	105
Sugar	19

Dinner.

Fresh meat	230
Vegetables	40
Butter	6
Rice	30
Salt	12
Bread	190

Supper.

French beans or kidney beans	40
Butter	6
Salt	5
Coffee	9
Sugar	19
Bread	165

It must be taken into account that the 230 grams of meat are to be given only when the value of this article does not exceed 13 cents per kilogram.—*Mexico Militar, April 1, 1901.*

PETARDS FOR THE USE OF THE MEXICAN CAVALRY.

This small instrument for demolition consists of a cartridge of 100 grams of Nobel dynamite, inclosed in a box 14 centimeters long, 3½ wide, and 2½ high, one of its ends having a perforated cover or lid, in whose perforation is inserted a wooden plug with strap attached with which to extract the plug when it is desired to use the petard. This petard with which the Mexican cavalry is equipped is not in any way dangerous to handle, since it is safe under any gradual pressure or sudden blow to which it may be subjected. A rider and his horse or a loaded mule may fall on it, or it may be struck a blow with a hammer, and it will not explode. In order to fire it the use of the fuse is necessary. Contact with a flame will cause it simply to burn slowly. However, a gun discharged at a short distance may cause it to detonate.—*Mexico Militar, February 1, 1901.*

The secretary of the war and navy departments has published detailed instructions* relative to the use of petards.

RUSSIA.

PRIZE FENCING IN THE CAVALRY.

Prize fencing has been introduced in the cavalry for the purpose of developing adroitness in the handling of sabers and includes fencing and fighting in general. It takes place every year before the summer exercises. A commission presides over the combats, in which ten men take part from each squadron. Four men are then selected from each ten for the prize fencing itself, which takes place before the same commission, under the presidency of the regimental commander. The judgment is pronounced not according to the number of blows given to the opponent, but with regard to the quickness, force, and sureness with which they are dealt. Each cavalry regiment is allowed four prizes. The first prize consists of a watch with the emperor's picture, costing about $10; the second is a watch costing about $7.50, but without the picture; the

---

*Detailed instructions can be found in any work of practical military engineering.—*M. I. D.*

third and fourth prizes are in money, and amount, respectively, to $5 and $2.50. Each regiment gets, for the purchase of these prizes, $25 per year. For the purchase of prizes for the whole Russian cavalry $3,045 are necessary.—*Militär-Wochenblatt, May 29, 1901.*

TRAINING OF OFFICERS IN MILITARY BALLOONING.

Practical exercises begin after six months' theoretical course. During the latter course the students are taught the history of ballooning, the present condition of the same, meteorology, higher mathematics, chemistry, and photography. Practical exercises consist chiefly in the preparation of hydrogen and in ascents in captive and free balloons. Each officer detailed for this course must participate at least in two free ascents. Every officer taking the military balloon course must pass an examination in the fall, after which the engineer officers are detailed to fortresses while others return to their troop units. Among other subjects the officers are examined with regard to the kinds of balloons employed by the various nations as well as with regard to the training of carrier pigeons for military purposes.—*Internationale Revue über die gesammten Armeen und Flotten, November, 1901.*

BICYCLE FOR SANITARY TROOPS.

One of Moscow's bicycle factories has constructed a new type of folding bicycle which, though not differing in its outward appearance from the cycles used in the military commands, may quickly be transformed into a very comfortable stretcher for the carrying of wounded or serve as a means of transportation for the sanitary officer from the dressing station to the field of battle. Fig. 30 shows the bicycle with the stretcher attached. Fig. 31 shows the bicycle ready to transport the wounded.—*Razviedchik, March 27, 1901.*

CREATION OF A CADET CORPS AND PREPARATORY SCHOOL.

In order to increase the number of officers, the Russian government has for two years been increasing the cadet corps by augmenting the strength of the already existing establishments and creating others, as well as by organizing in distant places preparatory cadet schools. The preparatory school of Khabarovsk has been reorganized into a cadet corps. Like the corps recently created at Warsaw, Odessa,

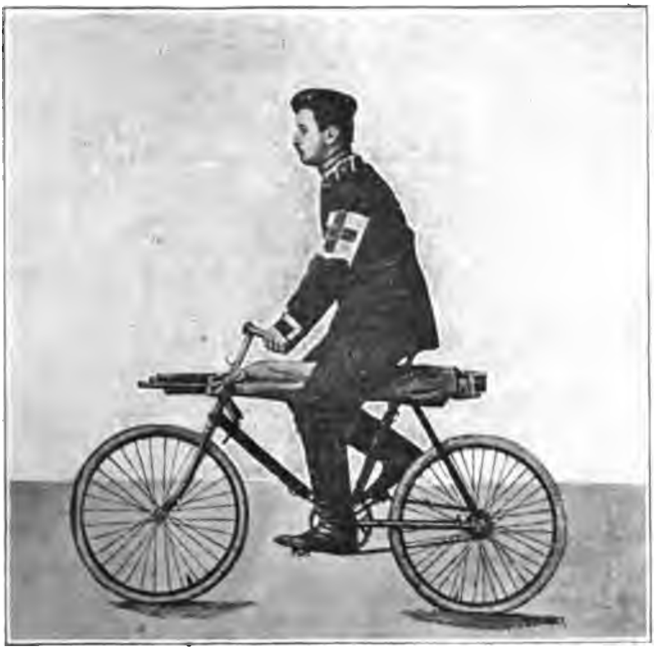


Fig. 30.

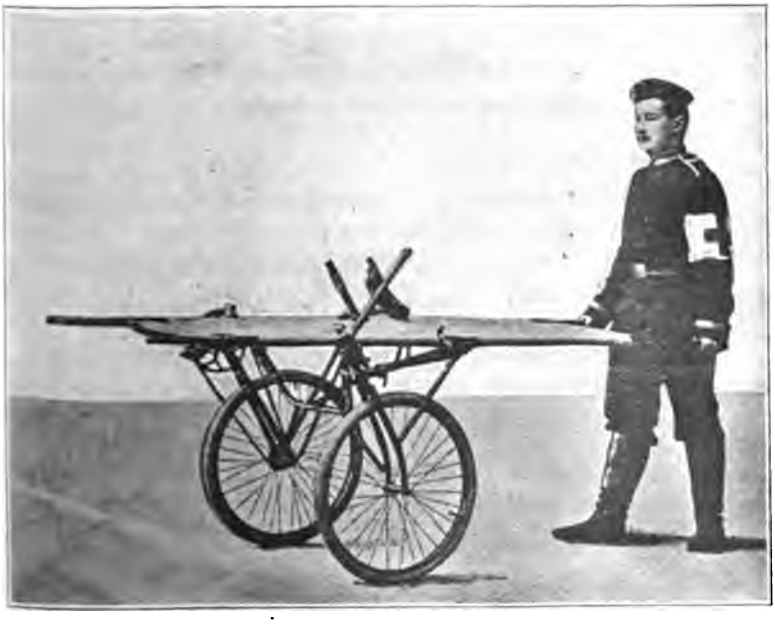


Fig. 31.

and Sumy, that of Khabarovsk will be developed gradually. In 1905 it will reach its normal strength of 300 cadets. This corps may, like the others, also accept special cadets, paying cadets (about 30 in number), and day scholars. It is intended for officers' sons and for the sons of officials serving in the Amur and the Kwangtung (Port Arthur) military districts.

The organizations thus started between 1899 and 1900 will reach their full strength in 1906. The cadet corps will then furnish annually 300 more cadets for officers' schools than at present.

A preparatory school for the cadet corps of the Don has been created in Novocherkask. It is under the command of the ataman* of the Don army. This school has 50 cadets and may accept 15 day students. The course lasts eight months, from September 1-14 to May 1-14; at the end of the course the cadets present themselves for examination at the Don cadet corps. This preparatory school accepts boys between 9 and 11 years of age. Those who at the age of 12 have not been able to enter the cadet corps are returned to their homes.

At the present time the distribution of cadet corps among the various military districts is as follows:

DISTRICT OF ST. PETERSBURG.—Five corps, four in St. Petersburg (first, second, the Alexander corps, and the Nicholas corps), and one at Pskov.

DISTRICT OF FINLAND.—One corps, named Finland cadet corps, at Fredrikshamn. This corps is also a military school. The students may graduate as officers.

DISTRICT OF VILNA.—One corps at Polotsk.

DISTRICT OF WARSAW.—One corps at Warsaw.

DISTRICT OF KIEF.—Three corps, one at Kief (Vladimir cadet corps), one at Poltava (Peter cadet corps), and one at Sumy.

DISTRICT OF ODESSA.—One corps at Odessa.

DISTRICT OF MOSCOW.—Seven corps, three at Moscow (first, second, and third Moscow cadet corps), one at Voronezh (Michael cadet corps), one at Orel (Bakhtina cadet corps), one at Yaroslav, one at Nizhni-Novgorod (the Arakcheyev cadet corps).

THE DON PROVINCE.—One corps at Novocherkask (Don cadet corps).

---

*Commanding general of Cossacks.

District of Kazan.—Three corps, two at Orenburg (Nepluyev cadet corps and second Orenburg cadet corps), and one at Simbirsk.

District of the Caucasus.—One corps at Tiflis.

District of Turkestan.—None.

District of Siberia.—One corps at Omsk (Siberian cadet corps).

District of the Amur.—One corps at Khabarovsk.

To this total of twenty-six cadet corps, the following ought to be added:

1. The corps of pages, which, like that of Finland, is likewise a military school (only for sons of generals).
2. Two preparatory cadet schools (one at Irkutsk and one at Tashkent), the students of these establishments entering afterwards the Siberian cadet corps.
3. The preparatory school of Novocherkask, the students of which present themselves for examination at the Don cadet corps.
4. The school of Emperor Alexander II (at St. Petersburg), which likewise prepares for entrance to the cadet corps.
5. The school at Volsk (district of Kazan), the students of which enter the army as volunteers.—*Revue Militaire de l'Etranger, October, 1901.*

STUDY OF HINDUSTANI IN THE ARMY.

It has been stated by the Russki Invalid that the Russian officers who took the course of the Hindustani language at Tashkent, headquarters of the military district of Turkestan, have successfully passed their graduation examinations. These officers have read and translated with great facility Hindustani books and papers, and have proved that they can carry on a conversation in this language. This course lasted from 1899 to 1901. The six officers who graduated first have been proposed for pecuniary reward, and the first, Colonel Serebrannikov, of the general staff, will be proposed for a detachment in India for the purpose of perfecting himself in this language.—*Revue du Cercle Militaire, June 8, 1901.*

STUDY OF ORIENTAL LANGUAGES IN THE CORPS OF OFFICERS.

At the institute of Oriental languages which will open on the 15–28 of September, 1901, there will be eight vacancies, of which five are to be reserved for officers. Out of the seven students who graduated this year four were officers. These latter have been placed in troop units stationed on the Asiatic frontier.—*Revue du Cercle Militaire, July 27, 1901.*

ORIENTAL INSTITUTIONS.

Russia uses much zeal and practical judgment in endeavórs to secure its position in eastern Asia by administrative measures. To these belong, in the first place, establishments by means of which officers and administration officials are supplied with the necessary knowledge in the languages, customs, and religions, laws, and general geographical conditions of the neighboring East Asiatic nations such as China, Korea, and Japan. For this purpose two establishments have been created, one of them a year ago, and the other lately, both receiving the support of the respective ministries. These are the Oriental institute at Vladivostok and the Chino-Russian museum at Port Arthur, lately inaugurated.

The Oriental institute of Vladivostok is to prepare all officers in administrative duties pertaining to eastern Asia.

The program of this educational institution is very much to the purpose. It consists of four-year courses. The first year's course is common to all student officers. In the three following years the officers study in the Chino-Japanese, Chino-Korean, Chino-Mongolian, or Chino-Manchu division. The Chinese language is the principal subject of instruction in each of these divisions. To the various subjects belong knowledge of the geographical, political, social, military, and other conditions of East Asiatic states; their languages; the history of their relations to Russia; their commerce; international law, etc. During vacation some of the student officers are sent at the expense of the government to the East Asiatic countries. Those graduating with honors receive promotion to the next grade after their examination.

The Chino-Russian museum in Port Arthur supplements the courses of the institute. Its purpose is to acquaint the Russians, by its collections, with the conditions of the industries, agricultural products, etc., of China, and to acquaint the Chinese with those of Russia.—*Ueberall für Armee und Marine, 1901, book 8.*

CONSTRUCTION OF FORTS ALONG THE RAILWAY IN EASTERN CHINA.

The Nikolsko-Ussuriyski Listok announces that the direction of railways of eastern China has undertaken the construction of a series of small forts along the railway line beginning at the frontier station and going as far as Kharbin. These forts are constructed with clay walls some 0.80 meters thick and are surrounded by ditches. Within each fort are two houses and stable. Two turrets constructed at two angles of the fort are armed with one gun each.—*Revue du Cercle Militaire, July 13, 1901.*

THE SUMMER EXERCISES (HUNTS) OF THE OFFICERS' CAVALRY SCHOOL HELD AT POSTAVY.

The officers' cavalry school in St. Petersburg is similar to the German school of equitation, though with a broader program of education. The courses last two years. The school has rented a territory of 162,000 acres in the government of Vilna for hunting.

From August 15–28 to October 15–28 a detachment of the above-mentioned school, consisting of 200 horses and 250 men of the squadron belonging to the school and 80 officers, is stationed at that place. This detachment is divided into two parts.

The first part is composed of the officers of the first year's course. The hunts for them last two weeks, from August 28 to September 14. They then return to St. Petersburg to make room for the opening of the year's second course.

During these fourteen days the following exercises take place: Seven drag hunts and an eighth hunt for live game. These hunts are to give the officers, who take part in them, an idea of the more difficult exercises which they have to perform in the second year's course.

During the second period, from September 14 to October 28, occur the exercises of the second year's course. Two drag hunts take place, one over a distance of 6 to 8 miles, the other over a distance of 9 to 10 miles, after which there are hunts after game. The game, consisting of deer, wild goats, foxes, etc., belongs to the school and is taken care of in the hunting grounds of Count Przezdziecki, owner of the estate leased. The hounds, consisting of English foxhounds, are also the property of the school.

These hunts take place every other day, while on the alternate days rabbits are chased with greyhounds given to the school by the inspector general of cavalry, Grand Duke Nicholas Nicholayevich, the most zealous promoter of the sports of the school. In addition to the officers of the cavalry school, all field officers, who are promoted to the command of regiments, must also take part in the hunts. Although some of these gentlemen are over 50 years of age, they must always be well to the front in the riding and always conspicuously dressed in red. In drag hunts the drag is begun some 2 miles from the starting point and afterwards at 5 miles, thus affording the riders progressively longer uninterrupted gallops.

The obstacles are likewise of considerable importance, consisting of ravines and hurdles with ditches, to be taken at the gallop, creeks, woods with the lower branches somewhat trimmed off, steep slopes, etc. The greatest of all obstacles are fences made of wooden palings which can not be turned and are some 5 feet 7½ inches high. Our correspondent has not met such obstacles either in France, Russia, England, or Germany.

The leader of these hunts is the director of the school. His assistants are the permanent officers belonging to the personnel of the school. The squadron belonging to the school supplies the men and horses, but must also execute regulation exercises, patrol rides, etc.

To these hunts are admitted also guests from among the members of the "Chase and Hunt Club" which has been created by the inspector general and includes numerous officers as members. Within the regiments and corps there are also hunt clubs.

Our correspondent, K. Wolff, one of the best authorities on cavalry, closes his report by the following words:

"There is no doubt that the 'campaign school' of the Russian cavalry will be a great advantage to this branch of the service and will, in the near future, bring about a change in the training of the horses. So far, matters regarding equitation in Germany are in the lowest state of development."—*Militär-Wochenblatt, October 19, 1901.*

CAVALRY CROSSING A RIVER BY SWIMMING.

The third cavalry division terminated its summer exercises by a very difficult and interesting maneuver, the crossing of the Niemen by swimming in the vicinity of Kovno below its confluence with the Vilia.

At the place where this crossing took place the Niemen is about 2 meters deep, about 300 meters wide, the current approximating 2.10 meters per second. The crossing of the Niemen formed part of a tactical problem the general features of which were the following:

The southern detachment, comprising the third cavalry division and the third group of horse batteries, had to cross the Niemen in order to pursue the northern detachment, which was retreating after having crossed this river and destroyed the bridge.

The northern detachment comprised a cavalry brigade and 10 guns of horse artillery, the mission of which was to oppose the crossing of the Niemen by the southern detachment.

The ninth regiment of dragoons, constituting the advance guard of the southern detachment, and 4 guns of horse artillery, crossed the river by swimming in order to take up a position on the right bank of the Niemen and cover the passage of the rest of the division. The scouts of this detachment had previously crossed the stream by swimming accompanied by the chief of the general staff of the division. The clothing, weapons, and equipment of these scouts were partly transported on rafts. The scouts made the crossing under favorable conditions, but such was not the case with the squadrons, who traversed the Niemen some 40 meters lower down with a sand bank lying in the middle of the river. Many horses, carried down by the current, reached the other bank at a much lower point than the one indicated. Some of them, in spite of their riders' efforts, came back to the bank whence they started, and others whose strength gave out would surely have been drowned but for the presence of men with life-saving appliances in boats.

At this moment the commander of the division arrived and by his energy and example succeeded in reestablishing order. He ordered an unsaddled horse to be brought and, after a fight with his mount, succeeded in reaching the opposite bank at the point indicated.

The crossing of the artillery presented the greatest difficulties. The guns were dragged by cords along the bottom of the river. All went well until they struck against the sand bank mentioned above. Three hours were necessary to extract them from this difficult position by means of horses taken to the sand bank. In order to avoid the horses of the other squadrons being carried where the guns were, they were ordered to cross some 100 meters higher, but they instinctively directed themselves toward their comrades on the sand bank, struck it, and gained the opposite bank with great difficulty.

The other units of the division executed the crossing without any accidents. Each squadron made the crossing in about seven minutes.

This operation has been mentioned because it is a very daring and particularly difficult one and because it reflects great credit on the Russian cavalry.—*Revue du Cercle Militaire, September 28, 1901.*

MARCHING MANEUVERS.

The Russian troops each year leave their barracks during the summer and spend about four months in camps of instruction.

The programs of maneuvers and exercises to be executed in summer are submitted each spring for the approval of the emperor. They are drawn up by the general staffs of military districts.

During the first part of their camp the various units execute the maneuvers of their own arms and prepare for their tactical role on the field of battle.

The various arms are then assembled at certain points and combined for general maneuvers. These combined maneuvers are for the purpose of establishing their common action and of accustoming the higher officers to command all branches.

Combined maneuvers last four weeks, the last days of which are used for maneuver marches, during which the troops, changing camp every day, are exercised on terrain unknown to them.

The durations and plans of the maneuvers vary in different military districts. In the Kief military district they are on a large scale. With a view to rendering as uniform as possible the plans of these maneuvers, the minister of war published, in 1900, general instructions which will be analyzed further on.

The duration of combined maneuvers (four weeks) is divided as nearly as possible into two periods of two weeks each. During the first of these periods the troops are exercised in camps. During the second they maneuver on varied terrain.

During the fifteen days that they are assembled in camp the great units maneuver in masses, execute tactical exercises in simple action, maneuver regiment against regiment, and execute combat firing exercises with the three arms combined.

The period of maneuver marches is taken up by exercises of marching and maneuvers, each party comprising a detachment of the three arms combined, the minimum strength amounting to an infantry regiment with the corresponding artillery and cavalry units. The effective strength is progressively increased.

The maneuver marches may be terminated by combined exercises between several divisions and even several army corps. In this case, if the duration of two weeks is adjudged insufficient, it may, with the authorization of the war minister, be increased. Maneuvers with real firing may also take place, if the terrain and circumstances allow this.

The maneuver marches are generally made by divisions and are directed in the beginning according to the instructions of the commander of the army corps. Later on, when the distances between the divisions have diminished, the divisions may be made to maneuver against each other and the exercises may terminate by the maneuvers of an army corps against a simulated enemy. Two neighboring army corps may also be opposed one against the other, but prolonged movements of large units are avoided.

As a general rule an infantry division maneuvers with its artillery brigade and a regiment of cavalry. As far as possible units not forming parts of army corps are made to participate in maneuver marches (as mortar regiments, engineer detachments,* etc.). These units are temporarily detailed to the infantry divisions.

The program of the maneuver marches is established by the general staff of the division after a reconnaissance of the terrain. They may be drawn up as follows:

Three days for regimental maneuvers.

Two or three days for brigade maneuvers.

Four or five days for division or army corps maneuvers.

The problems for the various maneuvers comprise the following exercises:

(*a*) MARCHES.—Security service; maintenance of communications; the shortening of columns, the artillery following roads and the infantry marching across fields.

---

*In order that the technical instruction of engineer troops be not interfered with, the units of this arm are detailed to maneuver only with large detachments, and even then only one-third of each brigade of engineers is thus detailed.

(*b*) SECURITY SERVICE.—In all its phases, night and day; relief of units.

(*c*) COMBAT POSITIONS.—Selection, occupation, organization of the attack and defense; a complete defensive organization to be executed once at least, employing a minimum of six hours for the work.

(*d*) CROSSING STREAMS.

(*e*) NIGHT OPERATIONS.—Marches; maintenance of communication between columns; attacks at daybreak; night combats.

Each week has five days of maneuvers and two of rest, including Sunday. The average length of a march is 9½ miles. Halts are made partly at bivouacs, partly under tents, partly in cantonments, which last is considered the best mode of stationing in time of war.

The supply of rations is made according to conditions approximating as nearly as possible those encountered in war. Supplies are carried in the knapsack. As the second section of regimental trains may arrive late at the halting places, it is often advantageous to prepare food either in individual kettles or in the field kettles. The men are also trained in the preparation of various farinaceous foods and in baking them in the ovens of the country so that they might temporarily replace bread.

The sick are left in military or civilian hospitals. Should these hospitals be too distant, a temporary infirmary is opened in a village situated at a central point on roads of the region in which the maneuvers take place.

The maneuvers have always the same general character, whether the command consists of two regiments or two divisions or even two army corps opposed one to the other. They constitute a series of distinct exercises. The tactical idea varies each day. Each day also the umpires and commanders are changed. This system seems to be of great value for the instruction of troops, as it varies the practical lessons. It is equally valuable for the instruction of officers who are often detailed to commands and other duties in which they can exercise judgment and initiative.—*Revue Militaire de l'Etranger*, *October*, *1901.*

MOBILIZATION EXPERIMENT IN THE CAUCASUS.

The czar ordered this year an experimental mobilization of a detachment of the "opolchenie" (territorial reserve of the empire) in the government of Stavropol, in the Caucasus. Before describing this experiment a few words must be said with regard to the "territorial reserve of the empire."

In case of war and in order to support the permanent armies the territorial reserve of the empire is called to arms. This army is constituted of the whole male population between 21 and 43 years of age which does not serve in the active army or the reserve. It forms a total of 10,000,000 men, of which foot "druzhinas" (battalions), mounted sotnias, batteries, fortress artillery companies, and fortress sapper companies are formed. These corps are grouped in brigades and divisions according to a plan drawn up in advance. The formation of the units of the territorial reserve of the empire is made under the direction of the governors of provinces, after which they are placed at the disposition of the war ministry.

The territorial reserve is specially intrusted with service in the interior of the empire and in rear of the armies, but it also forms part of active armies.

All young men upon reaching 21 years of age are liable to military service. The number of these young men reaches each year about 1,000,000, of which only 290,000 are taken for the regular army. The remaining 710,000 men, with the exception of those who are unfit for military service, are classified in the territorial reserve (first and second ban), where they remain, as has already been mentioned, until they are 43 years of age.

In a word, the "opolchenie," or territorial reserve of the empire, corresponds to the French territorial reserve and the German landsturm.

At the beginning of a war the corps of the territorial reserve forms an effective strength of 500,000 men, which can be increased to 2,500,000.

It may be seen from this that Russia possesses in her territorial reserve an enormous strength from which she can draw at will in case the war should be one of long duration.

The experiment of mobilization mentioned above is very interesting.

A commission composed of staff officers taken from the military district of the Caucasus and presided over by Major General Bolotov, chief of the local brigade, was appointed to preside over the mobilization operations of the detachments. Its mission was to supervise the formation, verify the accounts, and see to the execution of the orders from the military government of Stavropol and district of the same locality (subdivision of the military government). This commission, moreover, was to furnish a report on the operations concerning the mobilization. Moreover, two officers of the great general staff were designated to report on the results obtained with regard to military instruction.

According to the orders of the government the mobilized "druzhina" was to be composed of 217 men from the Stavropol district and 647 from the Blagodarnoye district belonging to the class of 1900, or a total of 864 "ratniki," as the men of the territorial reserve are called.

The city of Stavropol was designated as the principal assembling point of the "druzhina" and the first day of mobilization was August 12-25. The special assembling points were the city of Stavropol for one company and the Blagodarnoye municipality for three others. These three companies, after assembling at Blagodarnoye, had to travel 81 miles to get to Stavropol, the general assembling point.

* * * * * * *

On August 12-25, all the men of class 1900 of the Blagodarnoye district presented themselves before the authorities of this municipality and were quartered with the inhabitants, who received them with open arms.

Most of the "ratniki" were brought in vehicles by their relatives to the assembling points. Notwithstanding all possible explanations given by the authorities, the peasants were convinced that the czar had convoked them to be sent to war. For them the mobilization was real. Their sons were leaving them for three years and were going to fight. The parents, consequently, provided them with good clothes and provisions. With but a few exceptions, the "ratniki" arrived at the assembling point with the following clothing and provisions: One pair of new boots (some of them had even two pairs), new regulation summer clothing, warm clothing, a cloth overcoat, three new shirts, three underdrawers, three new linen bands for the feet (instead of stockings), three pairs of mittens, fresh bread and hard-tack for thirty days. It was under these conditions that the "ratniki" presented themselves to the authorities of Blagodarnoye at 6 a. m. They were, as has already been stated, accompanied by their mothers and wives shedding bitter tears.

The official intrusted with the military affairs of the district, after having read the imperial order prescribing the formation of the "druzhina," invited the men who desired to go to leave the ranks. At this the 1,000 men who had been called to the colors advanced like one man toward the balcony on which the official was standing, with shouts of "All, all!" Two surgeons of the district immediately proceeded to the medical examination. The men found unfit for the service were discharged, others were enrolled in the second ban of the territorial reserve and others were released.

The operations of the first day began at 6 a. m. and closed at night. Four hundred and thirty-two men were declared fit for the service and assigned to the first and second companies of the Blagodarnoye district. In the evening the "ratniki" were taken to the church, where they took the oath of service.

On August 13–26, the first and second companies began their military instruction under the direction of the reserve sergeants major. At 1 p. m. the third company was likewise organized and led to the drill ground.

* * * * * * *

The distance from Blagodarnoye to Stavropol being 81 miles, the military authorities decided that, in order to accelerate the mobilization, the three companies of the Blagodarnoye district should be taken to the city in vehicles. A requisition of 216 wagons was made and assembled at Blagodarnoye on the evening of August 13–26, i. e., on the second day of mobilization.

The military authorities asked for wagons drawn only by one horse each, but the inhabitants brought mostly two-horse vehicles.

At 7 a. m. on August 14–27, the three companies of Blagodarnoye were present at divine service, and after having been successively spoken to by the priest, Lieutenant Colonel Sokolov, and the municipal authorities, who offered them bread and salt, the customary welcome ceremony, the "ratniki" marched through the town singing. Upon their exit from the town the 467 men of the Blagodarnoye district got into the wagons and the column started.

In all the villages passed by the column the inhabitants treated it to provisions and the authorities offered it the bread and salt. Thanks to the good condition of the wagons and the excellent horses hitched to them it was possible to make from 5½ to 6 miles an hour. At the beginning of the march, on account of the ignorance of the peasants as to driving vehicles in a column, the procession extended 5½ miles.

In order to diminish the line the wagons were driven in column of fours, the length thus being reduced to 1 mile. Relays were organized at certain distances, and in order to avoid loss of time by the transfer of the men the new vehicles were disposed on the outskirts of the villages at intervals, allowing the old ones to draw up beside them. The "ratniki" had only to jump from one wagon to another. In spite of this the operation required about one hour.

On August 16–29, at 2 p. m. (fifth mobilization day), the three Blagodarnoye companies entered Stavropol singing and were there received by the president of the commission, General Bolotov. In the evening the "druzhina" was completely organized, the four companies amounting to 864 men. On the next day, August 17–30, the "druzhina" began exercises which continued until September 2–15.

* * * * * * *

To officer the "druzhina" all retired subaltern officers of the government of Stavropol and the Kuban province were called to the colors, but out of six only three answered the call. In order to complete the number of officers (two per company) those of the active army had to be called to service. The command of the "druzhina" was intrusted to Lieutenant Colonel Malkievich of the two hundred and fifty-second reserve battalion. The third company was officered by retired officers.

The period of instruction, not including holidays, was only twelve days of exercises, but the whole programme drawn up by the military authorities was gone through.

On September 3–16 took place the examination of the "druzhina" before the commission. The theoretical and practical results were satisfactory. A "ratnik" who was asked, "How does a sentinel salute?" could not explain, but answered, presenting arms, "In this way." The illiterate had some difficulty in placing the sight, and when asked how they would do it they answered, "We will do as our neighbors do." The members of the commission having ordered the sights adjusted for a certain range for firing, the illiterate glanced at their neighbors and placed the sights correctly.

The commission ordered volley firing to be executed in its presence for a duration of one minute and a half. The platoons of the first and second companies fired at 400 paces, one platoon of the third at 800, and the fourth at 1,000 paces. Although the wind was unfavorable the results were satisfactory. The author of the report on the mobilization and instruction of the "druzhina" states that the results were excellent, considering the fact that the men had only twelve days of exercises and only eight drills being devoted to firing.

On September 4–17, General Bolotov made each company execute the following exercises in his presence: Manual of arms, changes of direction, deployments at double time and at a run, bayonet attack. The inspection ended by exercises in closed ranks of the entire "druzhina" and by small tactical maneuvers. The general successively questioned all the non-commissioned officers. Lastly they paraded before the governor of Stavropol, Lieutenant General Nikiforaki.

The food expenditure did not exceed 10 cents per day per man. The cooking was done per half battalion. The man got a hot breakfast at 6 a. m.; dinner, consisting of 111 gr. of meat, at noon; a hot meal in the evening; also 1,230 gr. of bread for the day. In addition to this the "ratniki" received an abundant supply of food from their relatives.

The whole "druzhina" was quartered at the barracks.

After hearing divine service the men deposited their arms and were sent back to their families. The mobilization exercises lasted only twenty-eight days.—*Revue du Cercle Militaire, November 16, 1901.*

WINTER MARCHES IN SIBERIA.

On February 13, 1901, the Strietensk infantry regiment reentered Strietensk upon its return from Manchuria. This regiment formed part of the Rennenkampf column and distinguished itself especially in the attack on the passes of the Great Khingan. The return march lasted thirty-six days, during which the regiment made over 621 miles, or an average of over 17 miles per day. The thermometer fell to 35° and 67° F. below zero. The soldiers carried the complete equipment and the rifle, a thing which is exceedingly trying at such low temperature. The speed of the march was 3 miles per hour. The general health was excellent and the discipline perfect. Not a single case of freezing was recorded. On entering Strietensk the regiment fired guns taken from the Chinese.

It is necessary to add that this regiment had left Blagovieshchensk for the front in the summer of 1900 and that the first part of the campaign took place during the season of excessive heat.—*Memorial de Artilleria, April, 1901.*

INSTRUCTIONS CONCERNING MILITARY CANTEENS AND STORES.

The military stores are organized for the purpose of selling to soldiers objects of necessity of the best quality and at the lowest prices. Canteens are added to these stores and the men may get there both tea and food. Wine, beer, and brandy are tolerated but gambling is forbidden. These stores are under official management. The money necessary for their installation is drawn from the resources of the corps. The purchase and sale are made on cash payments. The prices are fixed by the commanding officer of the regiment or of the interested unit. A subaltern officer is placed in charge of the management of the store for a term not exceeding three years, and not less than one year. The number of men necessary is placed at his disposition. A superior officer is appointed each year for the supervision of the sales and purchases and a board, appointed each month, examines the accounts. The results are published in regimental orders. It is strictly forbidden to place the canteens and stores in the hands of speculators. The profits realized by the management are employed for the purchase of periodicals and the diminution of the prices.—*Memorial de Artilleria, January, 1901.*

SERVIA.

THE GREAT GENERAL STAFF.

The Servian great general staff forms a permanent corps. A condition for admission is a probationary term in the general staff. A certain number of officers, who have graduated from the war academy in the country or abroad, and have fulfilled the necessary conditions, are admitted yearly to this probationary term of service.

According to the Sluzhebni Voyni List, No. 33, these conditions are the following:

For first lieutenants:

(*a*) They must prove that they have been zealous and punctual at the war academy.

(*b*) That they have served with the colors at least three years.

For first and second captains:

(*a*) Same as for first lieutenants under (*a*).

(*b*) That they have successfully commanded, for at least one year, units appropriate to their grades.

For majors:

(*a*) Same as for first lieutenants under (*a*).

(*b*) That they have successfully commanded their battalions at least two years.

Applications for admission to probationary service are forwarded to the great general staff through regular channels. The respective commanding officers of the applicants forward with the applications their opinions as to the capacity and the service record of each officer in question. The last two years' record is likewise forwarded with applications.—*Internationale Revue über die gesammten Armeen und Flotten, December, 1901.*

TURKEY.

ADMISSION OF OFFICERS TO THE GREAT GENERAL STAFF.

The minister of war, in order to raise the intellectual standard of officers, decided last year to increase the number of officers taking the course of the military school, the number of officers of the great general staff, and the number of those taking the course of the academy of the general staff. Heretofore the young men graduated from the military school and the artillery and engineer school, about 15 to 20 in number, entered the academy of the general staff and upon graduation were detailed to the great general staff. They were appointed lieutenants upon entrance into the academy while their comrades entered upon their careers as second lieutenants only, no matter to what arm they belonged—infantry, cavalry, or artillery. After three years of study, the officers graduating from the general staff academy were appointed captains and detailed to the staff.

At present 50 officers enter the academy of the general staff, but they will have only the rank of second lieutenant. After having finished their first course they will be promoted to first lieutenants, with permission to wear a distinctive mark upon their collars (a yellow star).

Those who after the third year of study shall have passed their examinations will be appointed captains and sent to the

XII.—MANEUVERS.

THE FRENCH AUTUMN MANEUVERS, SEPTEMBER, 1901.

REPORTED BY CAPT. T. BENTLEY MOTT, ARTILLERY CORPS, UNITED STATES MILITARY ATTACHÉ AT PARIS.

The field work of the French army during the season of 1901 was perhaps more important than during any previous year, as regards numbers, area covered, and problems presented. Besides the garrison maneuvers and practice marches prescribed for each command and the maneuvers in the Alps and the Vosges, there were maneuvers of embarkation and debarkation in the face of an enemy and under protection of a fleet; maneuvers of thirteen cavalry regiments united into a cavalry corps; maneuvers of more than two army corps in the west, and the grand maneuvers of four army corps (augmented beyond their usual strength) and four cavalry divisions in the east.

COMBINED MANEUVERS OF THE ARMY AND NAVY.

The maneuvers of debarkation in the face of an enemy were on a larger scale than those ordered last winter in the Mediterranean, and it may be taken for granted that this is only the beginning of work of a similar nature. Three hired transports were loaded at Brest and Lorient on July 27th as follows:

The *Atlantique*, with 92 officers and 2,350 men;

The *Medoc*, with 64 officers, 1,250 men, 700 horses, and 12 field guns;

The *France*, with 83 officers, 2,200 men, and 37 horses.

The hire of these three boats amounted to about $13,000. The transports proceeded under convoy of the fleet (nineteen men of war) to a point near la Rochelle, where, on the 29th, one shipload was landed on the beach by means of the ships' boats under cover of the fleet's guns and the other two loads (including all the horses) were landed at the dock of la Pallice. The men were two days and nights aboard ship. The advance party sent ashore in the ships' boats made a landing and enabled reenforcements with guns to follow; then, having forced the enemy back, lighters were used to quickly land the rest, when a junction was made with the troops landing at la Pallice.

The preliminary maneuvers at once began between these invaders, the twenty-second division plus the colonial brigade, and the thirty-fifth division was charged with the defense. During the two days following, August 30 and 31, the maneuvers between these two divisions continued, the defenders falling back and the attacking party trying to cut off la Rochelle. Maneuvers of the twenty-first division against the thirty-fourth brigade and of the thirty-sixth division against the forty-sixth brigade were also begun.

By September 1 the whole of the eleventh and eighteenth corps, each increased by a brigade of cavalry, one of infantry, and a brigade of colonials, had been mobilized east of la Rochelle. The three ensuing days were devoted to maneuvers of division against division; then followed two days of maneuvers of corps against corps, then two days of maneuvers of an army of two corps against a represented enemy, and then the marches of dislocation.

That part of the programme which had to do with the embarking, transporting by sea, and disembarking a force in the face of the enemy, was on a much smaller scale than originally planned by General Brugère. It is understood that the commanding general was greatly disappointed that motives of economy made it necessary to cut down this part of his plan; but these preliminary studies made, we have reason to expect much more extensive work next year in the way of combined maneuvers of the army and navy of France.

GRAND MANEUVERS OF THE EAST.

This year the grand maneuvers had to be designated "of the East" and "of the West," for both were on a large scale and both fully deserving the usual terms of distinction, "grandes manœuvres." Several facts coincide to make the maneuvers in the east remarkable; the perfect nature of the terrain from a military point of view, the historical interest of the region, the unusual number of men employed, and the presence of the Czar of Russia as a spectator.

TERRAIN.

The scene of the maneuvers occupied the region lying north of Reims between the Meuse and the Oise, a rolling country of gentle hills and valleys, watered by numerous streams and covered with frequent patches of wood. There were no fences or hedges whatever, and though this is the famous champagne district, the maneuvers took place in a part containing no vineyards, so that troops of all arms could be moved with perfect freedom over the whole territory, using the roads only when it was more direct or convenient to do so. The only crop remaining in the ground was the sugar beet, and while a division of cavalry moving across a beet field caused some injury, it was far from destroying most of the crop.

This absence of fences or other inclosures and of autumn crops throughout most continental Europe enormously simplifies the question of peace maneuvers from the point of view of expense and tactics, and enables the operations to be conducted exactly as they would be in time of war. These conditions are so different in America that very few regions would readily lend themselves to similar work.

The composition of the maneuvering forces will be found in the "ordre de bataille," on page 299. They consisted of four army corps and four divisions of cavalry, a total strength of about 140,000 men and 35,000 horses (9,500 officers; 128,000 men; 24,500 saddle horses; 9,000 draft horses; 3,700 vehicles).

PRELIMINARY MANEUVERS.

The first week of September was devoted to marches and maneuvers of concentration; by the 8th the concentration upon the selected territory was complete and on the 9th the troops were given a day of rest. On the tenth there were maneuvers of division against division for the first, second, and sixth corps (the sixth being minus the fortieth division), and of the entire twentieth corps against the fortieth division, and of division against division for the cavalry.

MANEUVERS OF SEPTEMBER 11.

On the 11th the sixth corps, minus its fortieth division, maneuvered against the twentieth corps, reenforced by the fortieth division. The sixth corps was supposed to be the advance guard of an invading enemy coming from the upper valleys of the Oise with the idea of besieging Verdun; the twentieth corps opposed this movement. The forces marched as follows: The fortieth division from Varennes-en-Argonne by the road from Verdun to Vouziers; the eleventh from the same place toward Epinonville; the thirty-ninth division was in reserve at Cheppy. The leading divisions attacked the sixth corps between the farm of Granges and the village of Exermont and pushed it back toward the northwest. The fighting of this day was chiefly confined to cavalry combats, the infantry not making contact. On the following day, the 12th, there were no maneuvers for these troops on account of the long march they were obliged to make to reach the cantonments prescribed for them for the commencement of maneuvers of army against army, which were to begin on the 13th.

On this same day, the 11th, there were interesting operations between the first and second corps. The general idea was as follows: The first corps cantoned to the north of Vervins, with headquarters at Origny-en-Thiérache and outposts on the Vilpion brook, represented an army of invasion. The second corps, with headquarters at Marle and outposts on the Serre, the whole force about 15 kilometers south of Vervins, was charged with opposing this invading enemy.

The origin of this maneuver may be traced to the supposition that in case of war with an eastern power the neutrality of Belgium might be disregarded and an effort made to turn the eastern frontier, heavily defended as it is. Thus a force might descend into France from the direction of Charleroi and Marienbourg (in Belgium), mask the intrenched camp of Maubeuge, and march upon Laon.

The commencement of cavalry exploration was fixed at 5 a. m., and the whole body of troops was free to begin offensive operations at 6. The first corps, which had learned of the presence of the second on the line Montcornet–Agnicourt, directed toward this line two columns from Landouzy-la-Cour and Landouzy-la-Ville. The first moved toward Montcornet by Dagny and Renneval, the second toward Agnicourt by Plumion and Vigneux. The second corps moved to the north of the Serre, taking as a general direction the wood Val-St. Pierre but passing to the west of it.

About 9 o'clock, when the advance guard of the right column of the first corps arrived near Nampcelle, opposite the edge of the wood, it was attacked by a party of the enemy which debouched therefrom. More troops came up, and the engagement became warm. The second corps did not advance far outside of the wood, and indeed held back within it, covering it with troops thrown out in front, which also reached as far as le Hocquet.

The first corps did not attack the wood seriously, but left an observation force in front of the northern edge and took le Hocquet as an objective, all the more so as its left column arrived about 10 o'clock and directed itself upon Vigneux, a little south of le Hocquet. The artillery of this column took up good positions near the hill marked 215 to the southwest of Dagny.

A heavy attack was then prepared in the direction of Vigneux, but this could not be pushed home because considerable bodies of the enemy, the second corps, now showed themselves on the hills to the east of the village and were also still masters of the wood. However, le Hocquet and Vigneux were carried, but here General Duchesne, directing the maneuver, interrupted it.

As on the 10th, torrential rains greatly impeded the progress of the maneuvers and made the work very trying for the men.

MANEUVERS OF SEPTEMBER 12.

On September 12 the maneuvers of corps against corps continued. No decisive results having come of the fight between the first and second corps on the 11th, the maneuver of that day was continued on the 12th, only a little farther to the south, thus avoiding the troublesome wood of Val-St. Pierre. Each side was at liberty to take the offensive. The first corps was assembled at 8 a. m. near le Hocquet, facing south, its divisions side by side, the corps artillery with the right division. The cavalry and the cyclist company of the one hundred and forty-seventh watched the crossings of the Serre between Montcornet and Cilly.

The second corps moved in two columns from its cantonments to the south of the Serre to meet its enemy. The right column, with the corps artillery, took the road Chaourse, Renneval, Morgny, the left marched upon Dagny by Agnicourt, Vigneux, and le Hocquet. These columns were preceded by the cyclist company of the one hundred and thirty-second, sustaining the corps cavalry and charged with acting on the enemy's left flank. Shortly after 8 o'clock the opposing cavalry met to the west of Renneval, the advantage being with the first corps.

Later, the left column (the fourth division) of the second corps opened the action with the first corps around Vigneux-le Hocquet, and from 9.30 this division had nearly the whole second corps upon its hands, but at 10.30 the third division came to its support. Facing to the left, it moved on le Hocquet at the moment when the fourth was being driven back. The first corps in its success against the fourth division had extended its front too far and the opportunity for a decisive attack by either party could not present itself in time, as General Duchesne sounded the end of the maneuver.

MANEUVERS OF ARMY AGAINST ARMY.

On the evening of the 12th, after the maneuver just described, the first and second corps, with the fourth and fifth divisions of cavalry, were united into one army designated "A," under command of General Duchesne; the sixth and twentieth corps, with the second and third divisions of cavalry, into army "B," under command of General Kessler, and from this time on until the final review on the 21st the maneuvers were those of army against army. It was these operations which the foreign attachés were invited to follow in person. General Brugère, the vice president of the superior council of war and titular commander in chief, was the director of the maneuvers.

The theme was as follows: A hostile army, "B," has debouched from the Ardennes and an army of defense, "A," moves up to meet and drive it back.

Army B is concentrated on the Aisne as far up as le Chesne and Vouziers; its object is to move upon Rethel and Rozoy-sur-Serre and attack the enemy A, reported to be in the upper valley of the Oise. In case of check, it is to fall back on the fortified place of Reims, which is supposed to belong to it.

Army A is concentrated on the Serre near Rozoy-sur-Serre; it is to move to the Aisne at Rethel to attack the enemy reported massed near Vouziers.

INITIAL POSITIONS NIGHT OF SEPTEMBER 12.

The initial position of each army during the night of September 12–13 was as follows:

ARMY B, HEADQUARTERS AT VOUZIERS.

Sixth corps in the zone le Chesne, Tannay, Sy, Verrières, Belleville-sur-Bar, Longwé, Falaise, Terron-sur-Aisne, with outposts at Lametz, Semuy, Neuville-et-Day, Roche, and Mery; its cavalry at Louvergny and Sauville; headquarters at Quatre Champs.

Twentieth corps in the zone Vrizy, Vouziers, Savigny-sur-Aisne, Saint Morel, Mont St. Martin, Bourcq, with outposts at Grivy, Loisy, Coegny, Tourcelles, Quilly; headquarters at Vouziers.

Cavalry corps (second and third divisions) in the zone Amagne Sorcy, Ecordal, Charbogne, Attigny, Saulces-Champenoises, Mont–Laurent, Coucy.

ARMY A, HEADQUARTERS ROZOY-SUR-SERRE.

First corps, one division in the zone Logny-lez-Chaumont, Chaumont-Porcien, Pagan, Givron, Adon; the rest of the corps in the zone Iviers, Mont St. Jean, Bonnefontaine, Bay, Résigny, Mainbressy, Apremont; the corps cavalry in the zone Draize, la Neuville-lez-Wasigny, Wasigny, Bégny; headquarters at Mainbressy.

Second corps in the zone Nampcelle-la-Cour, Coignt, Rozoy-sur-Serre, Lislet, Chaourse, Vigneux; the corps cavalry at Renneville and Fraillicourt; headquarters at Montcornet.

Cavalry corps (fourth and fifth divisions) in the zone Nizy-le-Comte, Gomont, Blanzy, Asfeld-la-Ville, Villers-devant-le-Thour.

ORDERS FOR THE MOVEMENT OF SEPTEMBER 13.

The following orders were issued from the headquarters of the respective armies on the evening of September 12 for the movements of the next day:

ARMY A (FIRST AND SECOND CORPS AND FOURTH AND FIFTH DIVISIONS CAVALRY).

The cavalry corps (fourth and fifth divisions) under the orders of General Treymuller (commanding the fourth division) will move from Asfeld on Givry along the left bank of the Aisne, seek out the enemy's cavalry, beat it and push it back on the heads of the infantry columns. It will assemble near Avançon at 5.30 a. m.

The army will be preceded by a general advance guard composed of the first division of infantry and the first brigade of cavalry, which should occupy the heights between Rethel and Novy to assure the movement of the main body of the army to the south of the Plumion. This advance guard will follow the route Chaumont-Porcien, Adon, Doumely, Justine, Séry, Arnicourt, and Sorbon. Its main body should be opposite Herbigny at 6 a. m.

The main part of the army will march in three columns of divisions.

Right column, fourth division: Itinerary—le Thuel (where its head should pass at 6.30 a. m.), Waleppe, Hannogne, Banogne, St. Fergeux, Condé-les-Herpy.

Center column, third division and the elements of the second corps not belonging to any division: Itinerary—Fraillicourt (where its head should pass at 6.30 a. m.), Seraincourt, Ecly.

Left column, second division and the elements of the first corps not belonging to any division: Itinerary—same as that of the general advance guard. The head of this column should pass Chaumont-Porcien at 8 a. m.

The march of the army will be covered on the left flank by the fifth dragoons, and on the right flank by the third chasseurs.

ARMY B (SIXTH AND TWENTIETH CORPS AND SECOND AND THIRD DIVISIONS CAVALRY).

The cavalry corps (second and third divisions) under the orders of General Forney (commanding the second division) will assemble at 5.30 a. m. near Ménil-Annelles and proceed in the general direction of Asfeld-la-Ville. After meeting and defeating the enemy's cavalry it will turn off toward Chateau-Porcien and delay the march of the enemy's infantry columns. The first and twenty-sixth battalions of chasseurs-à-pied will proceed in support of the cavalry to Perthes, which they should reach at 10 a. m.

The general advance guard of the army will be composed of the fortieth division, the corps artillery of the sixth corps, and the sixth and twentieth brigades of cavalry. These troops should move by Amagne and Novy upon Bertoncourt in order to permit the main part of the army to get a footing between Rethel and Novy; they should debouch from Amagne at 8.45 a. m.

The main body of the army should reach, by 1 p. m., the line Acy-Romance, Rethel, Novy, Saulces-Mouclin.

The sixth corps will have for its zone of march the right bank of the Aisne as far as and including the road Tourteron, Ecordal, Sorcy, Auboncourt.

The twentieth corps will have for its zone of march the left bank of the Aisne as far as and including the road Pauvres, Ménil-Annelles, Biermes, Acy-Romance.

The troops will march in columns of division as follows from right to left: Twelfth, forty-second, eleventh, thirty-ninth. The heads of these columns should pass the line Ecordal, Attigny, Saulces-Champenoises, Pauvres, at 8 a. m.

The heavy battery (fourth, 155-millimeter howitzers) will march with the thirty-ninth division.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 13.

The two adverse cavalry corps met about 7 a. m. to the north of Perthes-le-Châtelet, and after two successive attacks the umpire decided that the cavalry of Army A had the best of it; the second division of cavalry (Army B) was therefore neutralized and marched to its cantonments; the third division was sent to cover the right of Army B toward Saulces-Mouclin; this about 9 a. m.

The cavalry of Army A carried out its orders, made contact with the left column of Army B as the latter debouched from Ménil-Annelles and sought to retard its advance by cannonading its advance guard. The latter deployed two battalions and a group of artillery (three batteries) and the first and twenty-sixth battalions of chasseurs coming up at the same time from Annelles upon Perthes-le-Châtelet, the cavalry of Army A fell back at 11 a. m. to the north of the railroad from Rethel to Reims.

The general advance guard of Army B had sent its two brigades of cavalry, about 9.30 a. m., to the heights to the east and west of the farm Pernant, where the men were dismounted to fight on foot in order to stop the advance guard of Army A and thus give time for the fortieth division to arrive and replace them on the position. This was done at 10.15.

The general advance guard of Army A succeeding in throwing two battalions into Bertoncourt at 10.30 o'clock. The main part of the first division followed and assembled to the north of the village. At 11.30 o'clock the fortieth division, supported by 14 batteries, attacked Bertoncourt. The first division, being supported only by its 6 batteries, was considered as being driven back. It retired at 12.15 p. m.

Thus Army B had attained the line Rethel, Bertoncourt, Corny-la-Cour, when the day's maneuver was finished.

Army A was established along the line Château-Porcien, Ecly, Séry, its advance guard organizing the defense of Sorbon and the heights of Arnicourt. The advantage of maneuvering had been so far with Army B; it had gained its preliminary objective and prepared to push its advantage the next fighting day.

It was intended to give the troops a rest on the 14th. The two armies therefore went into cantonments the night of the 13th, which they kept until the morning of the 15th, when the maneuver of that day began.

CANTONMENTS NIGHTS OF SEPTEMBER 13 AND 14.

ARMY A.—Headquarters at Ecly; cantonments in the zone Sorbon, Barby, Nanteuil-sur-Aisne, Château-Porcien, Herpy, St. Fergeux, Chappes, Doumely, Herbigny, Mesmont, Wagnon, Séry, Arnicourt, with one division of cavalry in the zone Wasigny, la Neuville, Lalobbe, Draize, Givron, and the other in the zone Asfeld-la-Ville, Blanzy, Gomont, St. Germainmont, Juzancourt.

Outposts along the line Signal-de-la-Croix l'Ermite, Nanteuil, Barby, Sorbon, Dyonne, la Malmaison, Mahéru.

ARMY B.—Headquarters at Amagne; cantonments in the zone Acy-Romance, Rethel, Bertoncourt, Novy, Saulces-Champenoises, Ménil-Annelles, Annelles, Biermes, Sault-lez-Rethel, with one division of cavalry in the zone St. Loup Terrier, Wignicourt, Puiseux, Chesnois, and the other in the zone l'Ecaille, St. Remy, Bergnicourt, Tagnon, le Châtelet, Neuflize, Alincourt.

Outposts along the line hill 144 (south of Nanteuil), hill 132 1,500 meters farther north), Pont d'Arcole, ferme Romicourt, bois de Trimont, Corny-la-Ville, Machéroménil.

The outposts were not established until 6 p. m. the 14th.

INTENTIONS OF EACH COMMANDER FOR SEPTEMBER 15.

The advance guard of Army A having been on the 13th forced back to the right bank of the Bourgeron (which flows into the Aisne between Rethel and the Plumion), its commander determined to resist on the 15th along his positions between the Bourgeron and the Plumion. In case of check he was going to hold the line of the Plumion in order to preserve his communications with the region Chaumont-Porcien, Signy-l'Abbaye.

Army B was to continue on the 15th its offensive movement successfully begun on the 13th, and try to cut off its enemy from the Aisne and force him back to the north.

The line of outposts was not to be passed by either side before 7 a. m.

ORDERS FOR THE MOVEMENTS OF SEPTEMBER 15.

ARMY A.—The commander of Army A decided to resist along the heights of Sorbon.

His orders were:

The first corps on the left will place its first division and its corps artillery as a first line between Sorbon and le Soirmont, inclusive. The second division will be held in reserve to the south of Séry.

The second corps on the right will place as a first line one brigade and the artillery of the fourth division; the other brigade of this division will remain with the corps artillery at Inaumont. The third division will form the army's general reserve and will assemble to the east of Hauteville at the crossing of the Justine road.

Trenches will be thrown up along the front of the position from the Aisne on the right to Soirmont on the left.

These dispositions should be finished by 6.30 a. m. on the 15th.

The cavalry brigades will cover the army's flanks, the first toward Novion-Porcien and Provizy (it will find support at Malmaison, where the second division will place a regiment); the second will watch the section Rethel, Nanteuil, Avançon.

The fourth division of cavalry will operate in the general direction Corny-la-Ville, Amagne, Givry; the fifth division of cavalry along the left bank of the Aisne toward Biermes, Thugny, and Perthes, Saulces-Champenoises, with the object of annoying the enemy's columns, retarding their march, if possible, and acting against their rear.

ARMY B.—The sixth corps will assemble its third division at 7.30 a. m., the fortieth and forty-second as a first line between Bertoncourt and Novy, the twelfth as a second line toward Chevières.

The twentieth corps will assemble at the same hour, the eleventh division to the north of Rethel, the thirty-ninth to the northwest of the town and under shelter of the hills marked 121–130.

The general reserve for the army will be composed of the six battalions of chasseurs and the two brigades of corps cavalry and will be assembled at 8.30 a. m. to the north of Pargny between the national road and the railway.

These movements are intended as a protection to the outposts which will be reenforced at daybreak.

The zones of march of the two army corps are separated by a line drawn from the farm Remicourt to the Château de Resson.

The right of the army will be covered by the third division of cavalry, which will operate to the east of the railway line Amagne, Draize, with the object of annoying the enemy's infantry columns, which will be maneuvering in this zone, and of drawing them eastward.

To the left, the second division of cavalry will operate on the plateau of la Croix l'Ermite with the object of retarding the march of the enemy's columns which may try to move upon Rethel by the left bank of the Aisne. One regiment of infantry of the twentieth corps near the farm of Blanc Mont will serve as a force to fall back upon in case of need.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 15.

It was the plan of General Brugère to have Army B push its opponent across the Plumion at first and then be beaten back across the Aisne and toward Reims in order that the succeeding maneuvers might proceed in logical order upon selected territory and bring the armies into the positions it was desired they should occupy for the final day, when the Emperor of Russia was to be a witness of the work.

Therefore, in order to give a decided superiority of position to Army B, he directed that a brigade of the twentieth corps should attack and take the villages of Nanteuil and Barby, near and opposite each other on the Aisne; this was done at 4 a. m., and naturally, under the circumstances, without difficulty. This enabled Army B to throw a bridge across the Aisne between these villages and facilitate the debouching of the twentieth corps upon the right bank of the river.

Properly speaking, the day's maneuver began at 7.30 a. m. The left of Army B was the first in movement, its directing line being the high road from Rethel to Ecly. This advance was prepared and supported by a tremendous force of artillery which quickly established a superiority of fire over the enemy's batteries. The village of Barby, which had been retaken by Army A with the seventh brigade (second corps, fourth division) again fell in the hands of Army B about 9.45 a. m., when the thirty-ninth division (twentieth corps) was brought against it.

The objective of the eleventh division (twentieth corps) was Sorbon; this place was taken and retaken by each of the two parties, but ended by resting in the hands of the twenty-first brigade (eleventh division, twentieth corps) at 10.15 a. m. The rest of the twentieth corps continued its forward movement; it had before it only one division (the fourth), which finally fell back to Ecly on the right bank of the Plumion. This about 10.30 a. m.

On the left of Army A, the first division (first corps) was attacked by the fortieth, whose objective was the hill marked 144 and Arnicourt; by the forty-second division, which was marching upon le Soirmont, and by the twelfth division, which sought to outflank it in the direction of Dyonne at 10.30 a. m.

The first corps put its second division into action at Séry and the farm Conversy, but at this time the center, being insufficiently supported by the reserves, was obliged to give way before the advance of the general reserve of the enemy B, viz, the sixth battalions of chasseurs à pieds and the corps cavalry. The twentieth brigade of cavalry (twentieth corps) supported the assault of the general reserve by repeated charges. At this moment (11 a. m.) the end of the maneuver was sounded.

CANTONMENTS NIGHT OF SEPTEMBER 15.

ARMY A.—Headquarters, Hauteville; cantonments in the zone Ecly, Inaumont, Séry, Mesmont, Wagnon, Grandchamp, Wasigny, Givron, Chaumont-Porcien, Logny-lez-Chaumont, Seraincourt, Renancourt, Son. The divisions of cavalry in the zone Draize, Lalobbe, la Neuville-lez-Wasigny; the fifth division in the zone Château-Porcien, Herpy, St. Fergeux, Chaudion.

The line of outposts will not extend southeast beyond the line Moulin (1,500 meters west of Herpy), farm Pargny, Taisy, the Plumion, farms of Conversy and Malmaison, hill marked 147, Mahéru, le Ronceau, le Moulinet.

ARMY B.—Headquarters, Rethel; cantonments in the zone Nanteuil, Barby, Arnicourt, Dyonne, Novy, Vauzelles, Auboncourt, Lucquy, Amagne-Lucquy, Coucy, Thugny, Biermes, Sault, Acy-Romance. The second division of cavalry in the zone Aire, Balham, Blanzy, Avançon, St. Loup-en-Champagne.

The line of outposts will not extend northwest beyond the line Gomont, Signal-de-la-Croix l'Ermite, the Plumion, the Urfosse, Vauzelles, hill marked 101 (1,000 meters south of Saulces-Monclin).

The third division of cavalry and the twelfth division of infantry (B) were cantoned in the region around the railroad from Launois to Amagne. This force was neutralized until September 16, at 7 a. m.

INTENTIONS OF EACH COMMANDER AND HIS ORDERS FOR THE MOVEMENTS OF SEPTEMBER 16.

ARMY A (FIRST AND SECOND CORPS AND FOURTH AND FIFTH DIVISIONS CAVALRY.)

The army will continue its resistance along the Plumion until the head of the column of expected reenforcements appears, when it will take the offensive.

The second corps will defend the front along Ecly, Inaumont, Moulin de Séry; its third division between Ecly and Inaumont, its fourth to the northeast of Inaumont, keeping one brigade in reserve.

The first corps will hold Séry and the Roman Camp with one division. The second division will place one of its brigades in the general reserve of the army to the east of Justine; the other brigade will be placed at the disposal of the second corps to reinforce its right to the northeast of Ecly.

These dispositions should be terminated by 7 a. m.

The safety of the army's flanks will be assured on the left by the first brigade of cavalry and on the right by the second brigade, which will find a supporting battalion at Château-Porcien.

The fifth division of cavalry will operate in the direction of the latter place; the fourth division toward Mesmont. They will both seek to get into the fight, with the object either of checking the offensive movement of the enemy or breaking up his columns and forcing them to retreat.

ARMY B (SIXTH CORPS MINUS TWELFTH DIVISION TWENTIETH CORPS AND SECOND DIVISION CAVALRY.)

Army B was to try to carry the enemy's position on the right bank of the Plumion and to that end the following initial dispositions for the attack, facing to the north, were ordered:

The outposts will be reenforced along the front Arnicourt, Soirmont, Dyonne, Bois de Trimont, ferme de Corny la Cour.

The sixth corps will assemble one division between Arnicourt and la ferme du Paradis, the other division toward la ferme Pernaut.

The twentieth corps will assemble a division at the hill marked 143 (1,500 meters southwest of Sorbon), the other division to the north of Rethel, across the road to Novion-Porcien.

These dispositions should be completed by 7 a. m., at which hour the preparation for the offensive movement by the artillery will begin.

The sixth brigade of cavalry will cover the right of the army.

The second division of cavalry, reenforced by the twentieth brigade of cavalry, will assemble at 7 a. m. at Signal-de-la-Croix l'Ermite, with the object of preventing the enemy from getting a footing on the left bank of the Aisne around Château-Porcien.

One infantry regiment of the twentieth corps will assure to the army the possession of the bridges at Rethel, Acy-Romance and Nanteuil.

SPECIAL MISSION ASSIGNED TO THE TWELFTH DIVISION OF INFANTRY AND THE THIRD DIVISION OF CAVALRY.

The twelfth division of infantry and the third division of cavalry will constitute, under the orders of General Hartschmidt, the advance guard of an army corps coming from Signy-l'Abbaye to reenforce Army A.

This advance guard will debouch from Provizy at 8 a. m., in the general direction of Rethel, and will attack with the utmost vigor the forces of the enemy which it meets, so as to give a free hand to Army A and enable it to assume the offensive and throw the enemy (B) back to the left bank of the Aisne.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 16.

Army A (first and second corps and third, fourth, fifth divisions cavalry, and twelfth division infantry)—Army B (sixth corps minus twelfth division; twentieth corps and second division cavalry).

At 7 a. m. the fortieth division (sixth corps, Army B) assembled between Arnicourt and le Paradis, sent a regiment (the one hundred and fifty-fourth) toward the hill marked 103, on the right bank of the Plumion, to open the action. But at this moment the commander of Army B was informed that a column of the enemy was debouching from Novion-Porcien, in the direction of Provizy, to reenforce Army A. He therefore decided to take a defensive attitude. Moreover, the one hundred and fifty-fourth infantry had been driven back in its attack by the seventh brigade upon Arnicourt.

At 8 o'clock the twelfth division (reenforcements for Army A) moved out of Provizy and took possession of Dyonne and the Bois de Trimont.

The first corps debouched in its turn from Sery and marched upon Soirmont.

The second corps attacked along the front of Arnicourt, Barby; but its action was not seriously felt by the enemy (B) until the attack of the first corps had broken the resistance of the fortieth division along the heights to the southeast of Arnicourt.

At 10 o'clock the twelfth division, which, it will be remembered, represented the advance guard of reenforcements for Army A, moving through the woods, attacked the forty-second division (sixth corps, B), posted to the north of Bertoncourt. Its right united with the left of the second division (first corps), which had gotten as far as le Paradis. During this time the first division established itself upon the heights southeast of Arnicourt (hills marked 144).

On its side, the seventh brigade of the second corps (Army A) had taken Arnicourt, and the rest of this corps got a foothold on the hill marked 143, southwest of Arnicourt, driving back the thirty-ninth division (twentieth corps), which retired by Barby and Acy-Romance to the left bank of the Aisne.

By 11 o'clock the twelfth division (Army A) had arrived before Bertoncourt, the second division (first corps) at ferme Remicourt. The first brigade of cavalry, profiting by a gap in the line of Army B, moved against the hill marked 130, where it successfully charged a group of three batteries.

At 11.30 a. m. the whole sixth corps executed a vigorous counter attack against the enemy (A) to the southwest of Bertoncourt, thus arresting the hitherto successful advance of the twelfth division.

But the first division and the second corps attacked the eleventh division (twentieth corps), holding on to the north of Rethel, and menaced the bridges at Nanteuil and Acy-Romance, thus rendering fruitless the good work done by the sixth corps. Rethel was under the fire of about all the batteries of the second corps. About this time the one hundred and forty-fifth regiment (second division, first corps) rushed the batteries of the twentieth corps and took them, but the eleventh division made a counter attack to regain these pieces and succeeded.

The second corps had paused upon the slopes to the north of Point d'Arcole.

At this moment the end of the maneuver was signaled.

CANTONMENT NIGHT OF SEPTEMBER 16.

Army A.—Headquarters, Rethel; cantonments in the zone Château-Porcien, Taizy, Nanteuil, Acy-Romance, Rethel, Bertoncourt, Sorbon, Ecly. One division of cavalry in the zone Herpy, Condé, St. Fergeux, Seraincourt, Remaucourt; the other division in the zone Seuil, Mont-Laurent, Givry, Amagne, Coucy.

The twelfth division of infantry in the zone Sault-lez-Rethel, Biermes, Thugny, Doux, Pargny, and the third division of cavalry in the zone Annelles, Ménil, Saulces-Champenoises, Pauvres, Mont-St. Rémy, Ville-sur-Retourne.

The line of outposts was not to pass to the southwest of the line Bray, Moulin de Herpy, ferme Pargny, Bois de Couroy, Signal de la Croix l'Hermite, ferme du Blanc Mont, fontaine du Vivier.

Army B.—Headquarters, Tagnon; cantonments in the zone Perthes-le-Châtelet, ferme la Cervelle, Avançon, Blanzy, Gomont, Balham, Aire, St. Loup, St. Rémy, Juniville. The twelfth division of infantry and third division of cavalry as above. The second division of cavalry was in the zone Berthancourt, le Thour, St. Germainmont, Juzancourt, Asfeld-la-Ville, Villers-devant-le Thour.

The line of outposts was not to pass to the northeast of the line Bannogne–Recouvrance, hills 155, 96, 145, 77, 134, 104, 131, Bois de Sevigny, de Mommont, des Tarnes, hills 144, 135, 154, 158, 163, 149, 119, and Bignicourt.

INTENTIONS OF THE TWO COMMANDERS FOR SEPTEMBER 17.

The commander of Army A expected to pursue his advantage against Army B (which had established itself on the left bank of the Aisne from Perthes-le-Châtelet to Blanzy) by endeavoring to outflank the right of his adversary. He determined to move forward from his outposts at 7 a. m. His cavalry was to begin operations at 5 a. m.

Army B having been driven back on the 16th to the left bank of the Aisne, its commander decided to endeavor on the 17th to establish himself on the Retourne between Mont-St. Rémy and Poilcourt, in order to have the support of the fortifications of Reims.

He was going to resist first along the line Tagnon, St. Loup-en-Champagne, hill marked 146. His outposts would hold their positions until 8 a. m. His cavalry was at liberty to move after 5 a. m.

ORDERS FOR THE MOVEMENTS OF SEPTEMBER 17.

Army A.—The army will continue its offensive and seek to envelope the enemy's right flank. The second corps, using the bridges at Nanteuil, Barby, and Château-Porcien, will cross and attack along the front Avançon, le Grand Bois, Bois de la Cervelle, taking care to cover its right by a strong flank guard.

The first corps will place a brigade at 8 a. m. near the hill marked 110 (west of Biermes) as a general reserve for the army and will then cross the river by the bridges at Acy-Romance and Rethel and move in the general direction of Biermes Perthes-le-Châtelet to attack the right wing of the enemy. This attack will not be pushed home until after the second corps shall be engaged along the whole front.

The fifth division of cavalry, reenforced by the second brigade of corps cavalry, will so maneuver as to outflank the enemy's left and neutralize the forces which they will encounter in the zone Blanzy–Avançon and to the southward.

The first brigade of cavalry will cover the left and accompany the movement of the second corps.

The attack of the first corps will begin at 7 a. m.

ARMY B.—The army will take up a defensive position from Tagnon to the hill marked 146 (northwest of St. Loup-en-Champagne).

The sixth corps will be on the right, with its divisions side by side, each with a brigade in the first line (in position at 7 a. m.) and a brigade in reserve (in position at 7.30 a. m). The first line of resistance is indicated by the line of the outposts, Bois de la Cervelle, Signal de la Croix l'Hermite.

On the right of the sixth corps the sixth and twentieth brigades of cavalry, united into a provisional division, will at 6 a. m. reach the tunnel of the railway and keep watch over the plateau of Perthes. The second division of cavalry will at the same hour arrive at the Signal de la Croix l'Hermite on the left and watch the crossings of the Aisne.

The twentieth corps will place at 7 a. m. one division in position on the hill marked 146 (northwest of St. Loup) and the other in echelon to the rear and left.

The heavy battery (howitzers) will be at la Cervelle at 6 a. m. at the disposal of the sixth corps.

The twelfth division of infantry will assemble at 7 a. m. between Biermes and Thugny, the third and fourth divisions of cavalry, united, at the same hour to the east of Ménil-Annelles. These troops will form a corps under the command of General Donop, who will receive in person instructions from the director of maneuvers as to the use he will make of this force in unexpectedly coming to the aid of one side or the other during the course of the day.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 17.

At 7 a. m. Army B, seeing that its adversary had abandoned the points supporting its line of outposts, a regiment of the forty-second division was pushed to Blanc Mont and a regiment of the fortieth division to the east of Croix l'Hermite.

From these positions the location of the points where Army A had massed the troops could be seen, and the artillery of the forty-second division opened a cannonade on the first corps assembled south of Sault-lez-Rethel. Under this fire the second division (first corps, A) deployed a regiment, which advanced upon Blanc Mont.

On its side the second corps had begun its deployment; it occupied with little trouble the height of Croix l'Hermite (9 a. m.), and marched against the positions occupied by the eleventh division (hill 146 and Avançon) and those of the fourth division (hill 126). Now the director of the maneuvers determined to reenforce the left wing of Army A by General Donop's mixed corps. The latter's orders were to move by Perthes-le-Châtelet and the hill marked 129 east of Tagnon upon the enemy's right wing, outflank him, and cut off Army B from his communications with Rethel.

From the outset of this movement, the twelfth division (Donop's corps) was in close communication with the first division (first corps). These troops debouched from Perthes at 9 a. m. The third and fourth divisions of cavalry (Dunop's corps) passed to the south of this village and moved upon the provisional division of Army A, which, feeling itself in a precarious situation, fell back by Tagnon in the direction of Bergnicourt.

By 10 o'clock Army A had reached the line Avançon, hills 126, 149, 128, 97, 129; its cavalry had sent a regiment against le Châtelet; the twelfth division was at the Carrière de Matagot. The first division crossed the railroad to the southwest of the park De Mont Repos and marched upon Tagnon. The second division marched upon Garenne-de-St. Loup to unite with the second corps, being checked for a time by a counter attack made by the enemy's twenty-fourth brigade. The fourth division marched against the hills marked 120 and 106; the third division upon St. Loup-en-Champagne The fifth division of cavalry kept watch over the enemy's third division of cavalry, with whom it had several encounters between Blanzy and the Bois d'Avançon.

At 11 a. m. the first division (first corps) took Tagnon and continued on to Bergnicourt, taking the main road on the axis of its march. The twelfth division continued its movement upon le Châtelet.

In spite of a successful counter attack delivered by the eleventh division, Army B, fearful of having its communications with Reims cut, began its retreat under protection of its rear guards.

The pouring rain and the heavy state of the fields aided the retreat of the army, or at least impeded the pursuit, and at 12.45 p. m., when the signal for the end of the maneuver was given, the force of the action had already greatly diminished.

CANTONMENTS NIGHT OF SEPTEMBER 17.

Army A cantoned in the region it had fought over during the day, between the Retourne and the Aisne; Army B along the line of the Retourne.

It was intended on the next day to follow up the work of the 17th, Army A hoping to force its opponent across the Suippes and take the outer defenses of Reims, while the latter decided to fight for time along the Retourne and try to protect Reims while hoping for reenforcements.

However, the following day brought weather worse than that in which the men had fought and marched the preceding days. The rain descended in torrents, and General Brugère humanely decided to confine the work of the day to a simple march from one cantonment to another, under cover of rear guards for Army A and advance guards for B. The men and horses needed this rest, for the work across the heavy fields during the previous days had taxed the endurance of all.

The maneuvers of army against army were thus finished and the troops were moved directly to the cantonments they were to occupy the night of the 18th in preparation for the work of the 19th, which was to be a maneuver of an army of four corps against a represented enemy.

CANTONMENTS NIGHT OF SEPTEMBER 18.

Sixth corps, Warmeriville, Aussonce, and la Neuville; cavalry around Bétheniville.

Twentieth corps, on the Suippe from Pont Givart to Isles-sur-Suippe; cavalry around Bertricourt.

Second corps, on the Aisne around Neufchâtel and on the Retourne as far east as Sault-St. Rémy; cavalry on the Aisne around Avaux and Asfeld-la-Ville.

First corps, at St. Loup, Roizy, and Neuflize; cavalry at Juniville and Alincourt.

Cavalry corps (third, fourth, and fifth divisions), in the zone Pontavert (on the Aisne), Juvincourt, Cormicy.

The line of observation was south of the Suippes from 1 to 2 miles, and roughly following that stream from Orainville on the west to Epoye on the east.

TROOPS CONSTITUTING THE REPRESENTED ARMY.

These were formed into a corps under command of General Tisseyre, and comprised the twelfth division of infantry, a provisional division composed of chasseurs à pied (two brigades), six batteries, and two companies of engineers, and the second division of cavalry.

The night of the 18th these troops occupied the following cantonments: Headquarters, Witry-les-Reims; infantry in the zone Brimont, Bourgogne, Fresnes, Pomacle, Lavannes, Witry, Berru, Beine; cavalry on the left from Bermericourt and Loivre south to the edge of Reims.

THEME OF THE MANEUVER OF SEPTEMBER 19—ARMY OF FOUR CORPS AGAINST A REPRESENTED ENEMY.

The enemy's army having been forced to abandon the line of the Suippe, has retired to the southwest of Reims in the direction of Paris.

To cover this movement the enemy has left at Reims a single corps, which occupies a position north of that place, holding the forts of Brimont, Fresnes, Witry, Berru, and Nogent-l'Abbesse (all permanent works).

The attacking army of four corps and three divisions of cavalry is on the Suippe and holds the crossings of that river. On September 19 this army will move against the positions north of Reims and try to take them by assault before the opposing troops have been able to organize effectively their defense.

ORDERS GIVEN FOR THE MOVEMENTS OF SEPTEMBER 19.

The commander in chief intends to use the two corps in his first line (the sixth and twentieth) to menace the enemy's right from Nogent-l'Abbesse to Witry-lez-Reims; to attack with his other corps the forts of Fresnes and Brimont, whose condition for defense appears to be incomplete, and finally, after forcing this front, to throw the whole force of the army against Berru by a concentric attack.

The sixth corps will assemble at 8 a. m., between St. Masmes and Vendétrée (on the Suippe); it will arrive at 9 a. m. at and to the north of Epoye to move against the line Nogent-l'Abbesse–Berru.

The twentieth corps will assemble about 8 a. m. to the south of Isles-sur-Suippe and arrive at 8.30 on the line of its outposts to march against the front Caurel–Berru. The eleventh division will assemble to the south of Bazancourt and remain there as a general reserve at the disposal of the commander in chief.

The first corps will cross the line of its outposts at 7 a. m., so as to attack at 8 a. m. the villages of Pomacle and Fresnes and then take the fort of Fresnes.

The second corps will begin at 7 a. m. the preparation for its attack against the fort of Brimont, which it should reduce to silence, and then it will take the village of Bourgogne.

As soon as the forts of Fresnes and Brimont are captured the army will pivot upon its left to take heights and works of Berru. The twentieth corps will take for its objective Fort Witry; the first corps from Fort Witry to le Poisson Vert; the second corps from le Poisson Vert to le Linguet.

The sixth brigade of cavalry will cover the army's left and operate between Nauroy and Beine.

The cavalry corps will assemble on the right of the second corps and come into action as soon as the fire from Fort Brimont is silenced; it will then (joining hands with the second corps) move upon Bétheny, and from there upon Cernay.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 19.

At 7 a. m. the second corps assembled its third division to the southwest of Pont Givart and its fourth to the southeast of Auménancourt-le-Petit, its brigade of cavalry covering the right of these movements. All of the corps artillery then opened on the works of Brimont.

At 8.30 the artillery of the fourth division began the preparation of the attack on Bourgogne. At this time the maneuver was interrupted for an hour, as the Emperor of Russia was expected to witness the operations and it was not desired to have the maneuver develop too fast. When work was resumed at 9.30 the fourth division resumed its attack on Bourgogne and took it at 10.15.

The first corps (whose second division had taken the village of Fresnes at the same hour) now directed itself upon the fort of Fresnes, concentrated the fire of all its artillery upon the works and tried to envelope them on each flank. The assault on the fort, witnessed by the czar from the ramparts, was delivered in a most spectacular manner and the fort taken at 11 a. m. At this moment the second corps debouched from Bourgogne, marched to the south and joined hands with the first corps. It was preceded by the corps of cavalry, which executed several charges against the troops of the first brigade of chasseurs à pied, which were falling back upon the line Bétheny-Witry.

At noon the twentieth corps began its attack upon Caurel and took it about 1 o'clock. Its right then united with the troops of the first corps, which had just taken the village of Witry, and moved against the fort of Witry.

By this time the second, first, and twentieth corps had joined hands and proceeded to execute an enveloping attack upon the front le Linguet, le Poisson Vert, Fort Witry, Berru.

On the left, however, of the twentieth corps a gap had been produced; the sixth corps was not in junction with the rest of the army. The commander in chief therefore decided to take part of the general reserve to fill this space and sent in a brigade, which marched south of Caurel and moved on Berru. The rest of the reserve (eleventh division) moved up behind the right of the thirty-ninth division (twentieth corps).

By 2 p. m. all the fractions of the army were in touch and moved in one great concentric attack against Fort Witry and Berru. The guns of nearly the whole army opened and then the infantry moved up from every direction. This was the great spectacle of the day, timed and carried out with much precision. The Emperor of Russia, who was on the heights of Berru, was a spectator of this magnificent sight, which closed the day.

The night of September 19 and until the return to their garrisons on the 22d, the troops cantoned in and around Reims to the north, the cavalry divisions being to the west and northwest as far as Prouilly and Pontavert.

September 20 was a day of rest and of cleaning up for the review of the 21st.

REVIEW OF SEPTEMBER 21.

The presence of the Emperor and Empress of Russia gave to the review an unwonted interest and significance. The weather was good and the absence of all dust enabled the magnificent spectacle to be seen in all its details. The bearing and marching of the men left nothing to be desired. The whole army of 140,000 men marched past in less than two hours, and not a break, a halt, or a lost distance was observed.

A noticeable feature of this (as of all such ceremonies in the French army) was the absence of galloping staff officers and messengers. No commands by voice or bugle were heard. All necessary orders were given beforehand, and once the troops were set in march all moved with perfect order, precision, and knowledge of what to do.

The infantry divisions and the artillery of Army A marched past first, then the whole of the cavalry of both armies moved by at the trot, the trumpets sounding; then came the infantry and artillery of Army B, the balloon park, heavy battery, cyclists, etc.

When the cavalry had passed, it moved in a body to a place about a mile from the reviewing stands and took post facing the latter. When the last units had marched past, this whole body of cavalry, fifteen brigades, moved forward in a charge and halted suddenly before the tribunes. It was well done and presented a most imposing spectacle.

NOTE.—The detailed orders and plans for the review are not appended, as they were given in Capt. T. Bentley Mott's report of the French maneuvers of 1900.—M. I. D.

OBSERVATIONS.

Last year the maneuvers were held under conditions of heat and dust; this year it rained most of the time, and off the roads the mud was deep and very sticky. The uniform was exactly the same for both conditions, except that the horsemen unrolled their long coats, which are provided with capes and are to a great extent waterproof; but the foot soldier has no overcoat, and he marched in the cold and rain of this year clothed in the same capote which last season seemed a rather hot garment for the weather. Extremes of temperature are rare in France, and as a man can not carry on his back in active campaign a wardrobe suited for every eventuality, the solution adopted seems satisfactory. In hot weather the capote, which is practically an overcoat with a narrow standing collar and no cape, is worn simply over the shirt; in cold weather, besides a heavier undershirt, the veste or shell jacket is worn under it. The man is thus relieved of the bulky burden of an overcoat.

INFANTRY.—The French soldier's habits with regard to carrying his pack are admirable. He never leaves it. He drills in it, shoots in it, and when, during maneuvers or in actual campaign, he moves to the attack, he would as quickly think of leaving behind his rifle as his pack.

Each squad constitutes a small family, which lives together. The cooking utensils, packets of twigs for firewood, and rations are distributed among the members of this family, and when the day's work is over and the "long halt" is ordered, there is no waiting for wagons to come up or cooks to make grand preparations. Each little family builds its fire, grinds the coffee (one man carries a coffee mill), boils the water, and makes a hot meal of whatever they may have on hand Then after a smoke and rest, maybe a nap, all start refreshed on the march to the cantonment for the night, which may not be reached till 6 or 7 o'clock. Here the "soupe" is made, rations of fresh bread and meat distributed, supper eaten, and the left-over cold meat and bread stored away in the haversack for the next day's lunch.

In leaving camp or cantonments in the morning, a similar saving of time is made, especially as all Frenchmen's breakfasts consist of a cup of coffee and a piece of bread. The men make this coffee for themselves by squad, clean and pack up the cooking utensils, and are ready for the march.

In the remarks on last year's maneuvers, the details of the uniform, its conspicuousness, etc., were noted, and it seems unnecessary to go into this again.

FORMATION FOR ATTACK.—There were no changes observed from last year's method of attack. In approaching the enemy from the artillery position, the infantry is quickly broken up into columns of companies and then of sections (one-fourth company) in line, and in this formation continues to advance (sometimes more than a mile) until obliged to deploy into a firing line. No effort at alignment of the columns is made; each battalion has its objective, and moves on it in rough alignment with the other battalions. That the maneuver may not develop too fast, the columns often halt, kneel, or unsling knapsacks and rest a few minutes.

There is no deploying first into "line of sections" and "line of squads" before the firing line is formed, as with us; these little columns of one-fourth company, each in column of fours, advance till firing must begin, when each column deploys at a run into a thin single rank, continues the advance in line, or halts and opens fire. The officers are close up to the line. The maneuver has the advantage of great simplicity; indeed, attacking troops have practically only two formations, the advance in columns of section and the deployment into single rank. Supports and reserves come up and thicken this line, and the mixing up of organizations does not seem to worry anybody.

The density of the columns advancing in the zone of infantry fire, especially the reserves, seems a bad thing, as they present large targets; but it must not be supposed that the French themselves believe in the tactical perfection of these dense columns of attack.

Many criticisms are heard in the professional press; it is probably believed that these things would correct themselves at once upon the field of battle, and that the supple columns of subdivisions would quickly be deployed into line by the captain when the losses began to be felt, and the slowness of the development of actual combat as compared with that of maneuver combat would lend itself to these modifications in actual war. In the attack commands are rarely given by voice; all is done with the whistle and signal. As in last year's maneuvers, very little attention seemed to be paid to taking cover; the men very rarely knelt to fire, though they often did so when not firing. I saw no firing lying down. Most of the firing was done standing, even at the shortest ranges.

There was not much advancing by rushes; when done, it was generally by company and was not really a "rush;" one company would open fire while another beside it moved forward at quick time about 50 yards.

CAVALRY.—The cavalry performed its work as remarked last year, making many charges on infantry, which, in actual war, it would not make and would not be expected to make. The training of both men and horses is certainly excellent. In fast movements and charges the horses are always well in hand and when the signal to halt or slow down is given no horses beyond control mar the movement. That the French know how to bit their horses and give their men proper hands is evident when one sees four divisions of cavalry under every condition and has never to remark a horse tossing his head or worrying at his bit. Nothing could be better than the bridle and bits, and the simple arrangement for removing the bits and using the headstall, etc., as a halter. The blanket is worn folded under the saddle as with us; the saddletree is in principle much like the McClellan, but is padded, has skirts, and is unnecessarily heavy.

Riding in France is chiefly a sport and a luxury; recruits for the mounted service generally have had no experience in riding, though they may be used to horses; therefore they have to be taught from the first principles. Their method of riding does not appeal to Americans, but the French cavalry officer is usually an accomplished horseman, has a good seat and still better hands. What is more, he usually has one or several excellent horses. The government, by an admirable system, provides him with at least one good mount.

ARTILLERY.—The remarks of last year on the artillery material and the formations in battery need not be repeated, as no changes have been made. The light piece which is being perfected for the horse artillery was not brought to the maneuvers, the horse batteries being armed partly with the regular 75-millimeter field battery piece and partly with the old 80-millimeter gun.

The very deep mud of the fields emphasized the fact that the new French field gun is quite as heavy as a gun should be. The artillery horses lost a good deal of flesh during the maneuvers (some of the batteries had been several weeks in the field), and they seemed to have suffered more than the infantry from the hard work and bad weather. The material was kept in splendid condition; however coated and befouled with mud a battery might be at the end of a day's work, the next morning it left its camp thoroughly clean.

The batteries at the maneuvers were constituted with one caisson to each gun. The battery in actual campaign consists consists of nineteen carriages, including twelve caissons, forge and wagon, forage wagon, and baggage wagon.

There is no front and rear sight on the new gun, a "viseur" taking the place of them, and enabling the gun to be laid using the principle of the "independent line of sight"—practically the same method adopted, and on which full reports have been made, for the Schneider-Canet field gun. The gun is sighted up to 5,000 meters.

Nothing has come under my observation indicating that this gun gets out of order easily; it seemed to stand the work of the maneuvers perfectly, but of course it was not fired with service charges. When it does need repair, however, an expert alone is permitted to attend to it.

MISCELLANEOUS.—There were four companies of cyclists at the maneuvers, one attached to each army corps. The company of the one hundred and forty-seventh infantry had 150 men; that of the one hundred and thirty-second, 130 men; that of the twenty-sixth chasseurs, 110 men; that of the second chasseurs, 120 men.

Captive balloons were used for signaling, for observation, and for wireless telegraphy, all with apparent success.

The rain and wind, as far as I could learn, did not interfere with the operation of the wireless telegraph and the test was severe, except for the absence of lightning. The balloon for this purpose has no basket or car. The cable for holding it is of twisted steel and constitutes the wave receiver and distributer. Near the wagon carrying the cable drum are installed two modified Morse instruments, one for sending and the other for receiving. Messages were sent as far as 15 kilometers.

The wagon of hydrogen cylinders is supposed to have sufficient gas to last fifty days under ordinary circumstances, but a machine for manufacturing the gas also accompanies the balloon park.

The batteries used for the Morse instruments are said to be chromic acid on the system of Colonel Renard, being very light, powerful, and of small volume.

Automobiles were used, as during the maneuvers of 1900, for commanders of armies and corps, for messengers, and for hauling supplies.

The general rules governing the conduct of the maneuvers, honors and reports to render, halts, meals, cantonments, umpires, ammunition, etc., were the same as given in full with my report of 1900.

The maneuvers this year were conducted under trying conditions of soil and weather, and thus not only furnished proof of the skill and ease with which the generals and the staff can maneuver and supply large bodies of men, but demonstrated the hardiness and the cheerfulness of the French soldier. At the end of a long day of marching in pouring rain and mud that stuck like wax, he would be seen trudging along the road or standing in the fields, not at all the picture of the patient, dogged peasant, but rather presenting the spectacle of a man who laughed at his hardships or was proud of them.

THE GERMAN AUTUMN MANEUVERS OF 1901.

[REPORTED BY LIEUT. COL. J. B. KERR, NINTH CAVALRY, UNITED STATES MILITARY ATTACHÉ AT BERLIN.]

Germany employed for the first time in September, 1901, combined land and sea forces in the Kaiser maneuvers. The scene of operations included northeastern Prussia and the Baltic Sea, where a Red army and Red fleet from the east advanced against a Blue army and a Blue fleet from the west.

The land troops participating in the maneuvers consisted of the entire first and seventeenth army corps with two cavalry divisions, the tenth infantry division of the fifth army corps, 8 regiments from the second, fifth, and sixth army corps, some additional machine-gun batteries, technical troops from various corps, and 12,050 men from the reserve and landwehr called into service for the maneuvers. Altogether the land forces numbered 75,000 men, 18,000 horses, and 538 field guns. The latter consisted of 396 guns of light artillery, 62 of horse artillery, 54 field howitzers, and 26 machine guns. In addition, there were 12 machine guns and 12 machine cannon with the landing force of the navy which participated in the campaign on land with the army. Besides these there were the seacoast guns, howitzers, and mortars of the fortifications in the vicinity of Danzig, the number of which was not given out, as information concerning seacoast fortifications is not furnished to foreign observers.

The naval force included the division recently returned from Chinese waters, and consisted of 10 battle ships, 4 coast battle ships, 8 cruisers, and 22 torpedo boats; altogether, 44 vessels. It was the strongest naval force ever assembled by Germany. It had a regular crew of 3,500 men and was capable of forming a landing force of 1,500 sailors and marines and still have left a sufficient force to fight the ships.

The director of the maneuvers was His Majesty the Emperor and King, Wilhelm II, and, in his absence, on land Prince

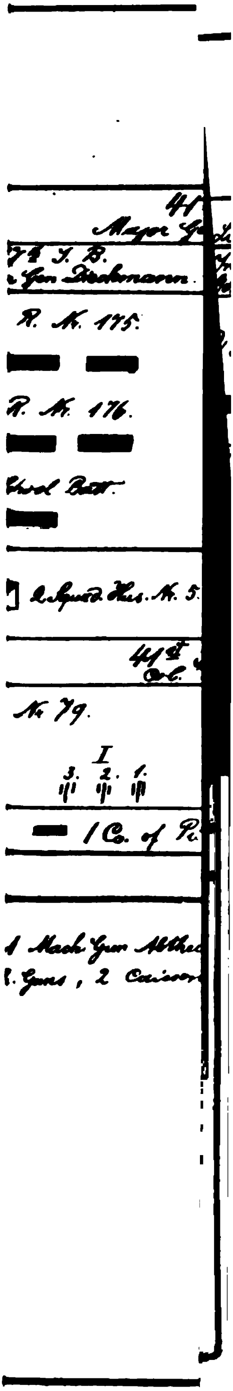
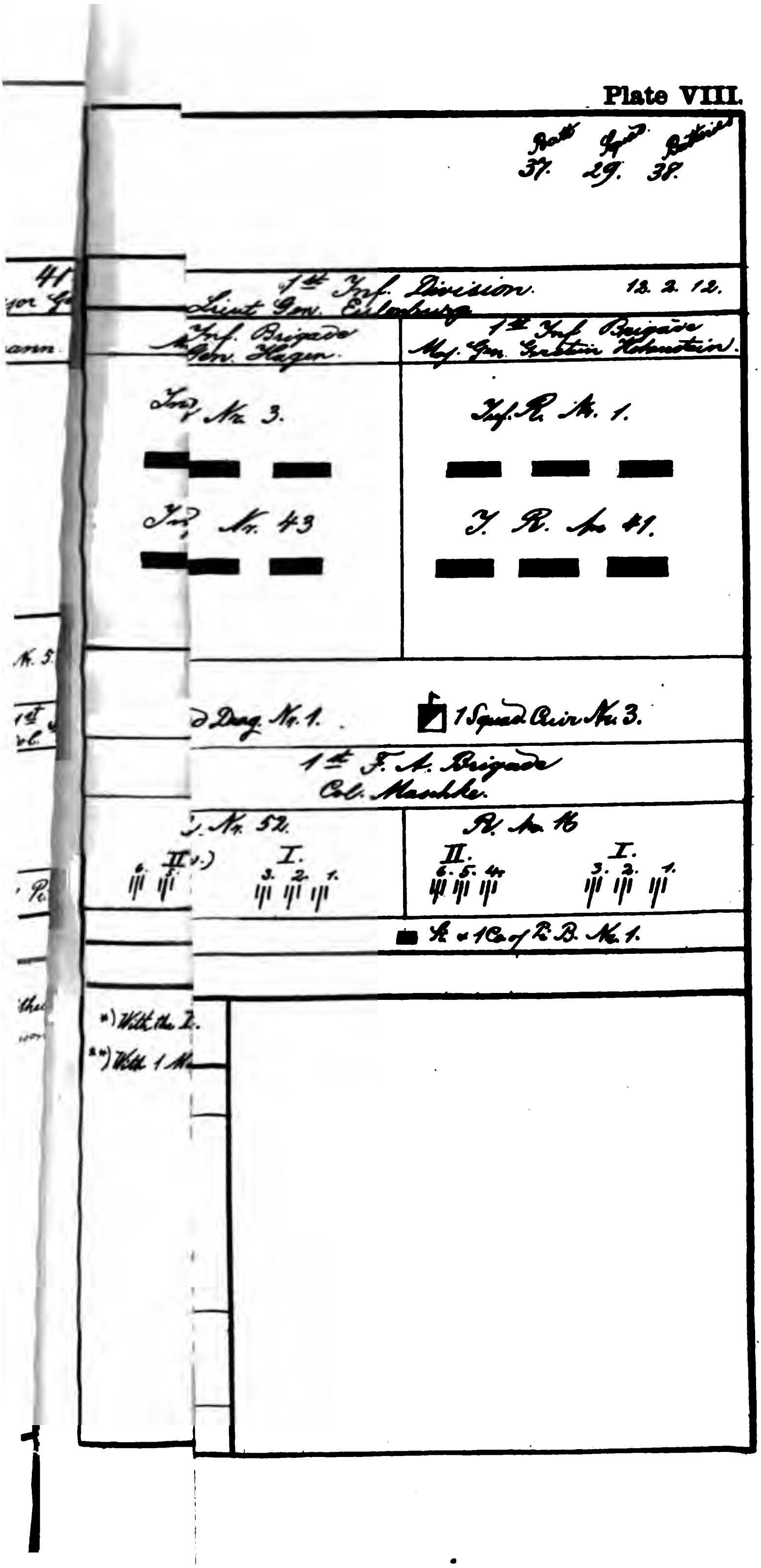
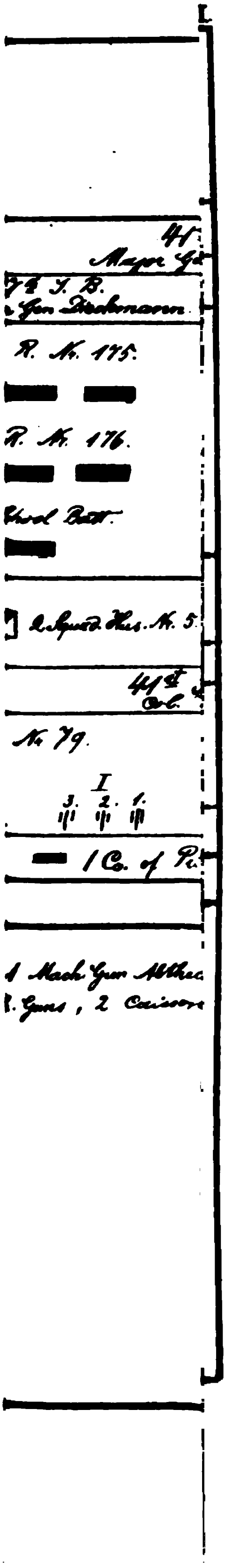

41
Major Ge
7th I. B.
Gen Dieckmann
R. N. 175.
R. N. 176.
hrl Batt.
2 Squad. Hus. N. 5.
41st
Col.
N. 79.
I
3. 2. 1.
1 Co. of Pi
1 Mach Gun Abthe
8 Guns, 2 Caisson

Plate VIII.



Batts. 37. Sqds. 29. Batteries 38.
1st Inf. Division. 12. 2. 12.
Lieut. Gen. Ellenburg
Inf. Brigade
Gen. Hagen
1st Inf. Brigade
Maj. Gen. Gretin Hohenstein.
Inf. R. Nr. 3.
Inf. R. Nr. 43
Inf. R. Nr. 1.
I. R. No. 41.
Drag. Nr. 1.
1 Squad. Cuir. Nr. 3.
1st F. A. Brigade
Col. Maschke.
Nr. 52.
II. I.
6. 5. 3. 2. 1.
R. No. 16
II. I.
6. 5. 4. 3. 2. 1.
St. & 1 Co. of P. B. No. 1.
41
Maj. Gen.
mann.
Nr. 5
1st
Col.
R.
*) With the I.
**) With 1 M


L
41
Major G
7? I. B.
Gen Dieckmann
R. Nr. 175.
R. Nr. 176.
Fld Batt.
2 Squad. Hus. Nr. 5.
41st
Cav.
Nr. 79.
I
3. 2. 1.
1 Co. of P
1 Mach Gun Abthei
Guns, 2 Caisson

Albert of Prussia, Regent of Brunswick and field marshal, and on the sea Admiral Von Köster.

Previous to the march of concentration for the maneuvers the land forces were stationed in their regular garrisons in provinces of East and West Prussia, Pomerania, Posen, and Silesia, and the five provinces nearest the scene of operations.

The first army corps, known also as the East Prussian corps, assembled at Königsberg on September 6, and the same day the entire fleet anchored in Danzig Bay. The West Prussian corps, the seventeenth, was concentrated at Danzig on September 15. The foot artillery occupied the forts and manned the guns in the fortifications in the vicinity of the mouth of the Weichsel River. Danzig is an important port and is strongly fortified. The seacoast artillery was a feature of the maneuvers, as the Red fleet made a determined attack upon the forts near Danzig.

The infantry regiments of the German army have either three or two battalions. There are seven regiments belonging to the first and seventeenth army corps with only two battalions. These regiments were reenforced for the maneuvers by one battalion each, established temporarily from men called in from the reserve and landwehr.

All of the active army not employed in the kaiser maneuvers participated in corps or division maneuvers. In addition, 167,726 men were called out for from fourteen to twenty-eight days' service in the maneuvers. Of these, seven-twelfths were called from the reserve and five-twelfths from the landwehr, and 10 per cent were noncommissioned officers. They were all taken principally from the younger classes. There were throughout the empire 770,000 men of the army in maneuvers at about the same time.

The accompanying diagrams show the organization of the first and seventeenth army corps with their cavalry divisions and the tenth division of the fifth army corps, as organized and reenforced for the maneuvers. The battalions, squadrons, and batteries were not increased above their authorized peace strength, but new organizations, also of peace strength, were established as far as possible. When the two army corps were concentrated, they were paraded, inspected and reviewed by the emperor, the first army corps on the Devaner plain near Königsberg and the seventeenth army corps on the large exercising ground 1 mile northwest of Danzig. As the formations for these two parades were in accordance with the prescribed regulations, and were in every respect similar, a diagram showing the positions of the organizations of one corps only, the seventeenth, is forwarded. Each corps when in parade line occupied a front of 1,500 yards and a depth of 400 yards. When the parades were formed the kaiser in each case led to the front of the center all the flags and standards of the corps, formed into a company known as the color company. The German infantry does not have regimental colors; instead, each battalion has a flag. Regiments which formerly had four battalions retain the emblem of the lost battalion; a few of the battalions on this account carry two flags. The cavalry regiments have one standard each, borne by the third squadron. The light artillery has no flags. Marked respect is shown the flag. Just before the departure of the emperor for the maneuvers there is held annually on the 28th day of August, in accordance with an old tradition, a characteristic and impressive ceremony—the "nailing and blessing" of all flags and standards destined to replace those worn out in service and those to go to the new organizations. At this ceremony for the year 1901 the emperor with a hammer drove the first nail in the lance of each flag, the empress the second, Prince Eitel Fritz the third, the son of the regent of Brunswick the fourth, and so on to the last nail of each flag, which was driven by the non-commissioned officer who was to carry it. Forty-eight flags and standards were thus nailed in thirty minutes. The emblems were then blessed by the high protestant chaplain of the guard and the general catholic chaplain, in the presence of many distinguished guests, a salute of 101 guns fired, and a march past the emperor was executed with music and escort.

When, at the parades of the first and seventeenth army corps, these flags were brought to the front by the emperor and saluted, they were then received by the commanders and marched to their places in line. The military attachés, as is customary, formed on the right of the parade lines. The emperor riding to the right was joined by them and all rode along the front of the lines. The troops then marched past once in column of companies, squadrons and abtheilungs (battalions of artillery) at half distance, and once in the same column formation closed in mass. The emperor having inspected and reviewed the troops, they began their march for the maneuvers.

m.
müller.

7th Inf. Br
r General

Nr. 141.

Brigade.
kenson.

4
er R.
41

The commander of the first army corps, General of Infantry von Finckenstein, commanded the Red land forces, and the commander of the seventeenth army corps, General of Infantry von Lentze, the Blue.

The Blue fleet was under the command of Admiral Prince Henry, brother of the emperor, and consisted of the west squadron and the Danzig coast defense squadron. The former included the battle ships *Kaiser Wilhelm der Grosse*, *Kaiser Barbarossa*, *Sachsen*, and *Wurttemberg*, the latter the coast battle ships *Hagen*, *Aegir*, *Siegfried*, and *Odin*, and there were also attached to the Blue fleet cruiser and torpedo boat divisions.

The Red fleet was under the command of Vice Admiral von Arnim, and consisted of the battle ships *Baden*, *Worth*, *Weissenberg*, *Brandenburg*, *Kurfürst Friedrich Wilhelm*, one large armored cruiser, and divisions of cruisers and torpedo boats.

The following was announced as the general war situation:

The Red army crossed the east frontier of East Prussia, forced the opposing Blue troops back to Königsberg, surrounded the fortress on September 8, and is now advancing toward the lower Weichsel.

The Blue forces are occupied on another scene of war. In East and West Prussia there are hardly any troops left outside the fortresses.

A Blue squadron lies near Neufahrwasser.

A Red squadron cruises before Danzig Bay.

SPECIAL WAR SITUATION FOR THE RED ON THE EVENING OF SEPTEMBER 11.

The Red army is to cross the Weichsel between Marienburg–Dirschau and Thorn, in order to advance in the direction of Berlin. The first army corps will form the right wing and cavalry division A is placed under its command, both of which have received special orders to cover the right flank of the army. They are restricted to the crossing points at Mewe and below, where the latter is to occupy the left bank on the 14th, and the former on the 17th. On the 11th the following points were reached: By the cavalry division A, the country between Drausen and Geserick lakes; by the first infantry division, Braunsberg, its advance guard, Frauenburg; by the thirty-seventh infantry division, Mehlsack, its advance guard, Wusen; by the second infantry division, Wormditt, its advance guard, Reichwalde.

The second army corps marched by Mohrungen, Saalfeld, Riesenburg, and Marienwerder, in order to cross the Weichsel at Kurzebrack. On the left it was joined by the other corps, on the marching route toward Neuenburg. A number of reserve divisions which follow the army corps are designated to surround Marienburg, which is fortified, as well as Graudenz and Thorn. Reenforcements for the Red squadron and a corps of troops to be landed west of the mouth of the Weichsel, are expected.

SPECIAL WAR SITUATION FOR THE BLUE ON THE EVENING OF SEPTEMBER 11.

In order that the invading Red army be repulsed, several Blue army corps were assembled behind the Brahe, having come by Stargard–Neustettin, Küstrin–Schneidemühl, and Posen–Schneidemühl. The seventeenth army corps, together with cavalry division B, attached to it, was sent forward on the hinter Pomeranian railway to Danzig—in the first place the infantry and artillery of this corps, and finally the divisional cavalry and two brigades of cavalry division B. The assembling will be ended on the evening of September 16. The eleventh cavalry brigade, belonging to cavalry division B, left the train at Konitz on September 8, advanced toward the Weichsel on the 9th, and reached Dirschau on the 11th.

A Blue squadron passed Gjedser (on Falster) the same day eastward bound.

Red intends to land troops west of the mouth of the Weichsel.

EVENTS.

The war ships were held united until after the reception of the Czar of Russia, who had accepted the invitation of Emperor Wilhelm to attend the maneuvers. Upon his arrival on September 11 he passed in front of the two first lines of ships paraded in gala attire in Danzig Bay. The same afternoon the fleet was divided into two parties and each sailed for its maneuver position. At 9 a. m. on the 12th the emperor went with the czar on board the flagship *Kaiser Wilhelm II.* At this time the coast squadron of the Blue fleet was cruising before Danzig harbor and the entire Red fleet in battle lines was approaching to attack.

The west squadron of the Blue under orders for Danzig had not arrived, but was still far to the westward.

The coast squadron retreated under fire toward the forts and then turned west in order to give a free field of fire to the

Blue coast batteries which opened upon the Red fleet. The fortifications at Neufahrwasser, Westerplatte, Weichselmuende, and Bresen, which had been given full artillery garrisons, were attached by the Red fleet, while the coast battle ships stationed themselves on the west flank of the line of forts at intervals of several hundred yards and continued their fire. Upon the approach of the Red fleet strong Blue infantry detachments were placed in covered positions in the intervals between the batteries, especially in the gun shelters of Westerplatte, to oppose with full force any landing attempts of the Red. This occupation of the coast by infantry continued during the night and the next day, but there was no attempt on the part of Red to land, as it had suffered severely. The Red battle ship *Baden*, which had been declared disabled, was towed off by the *Weissenberg*. Of the Blue, the *Hagen* had been put out of the fight. The Red fleet retired just beyond the reach of the seacoast guns, scouting the sea to the westward. At 2.30 p. m. all ships that had been put out of action were supposed to be again serviceable. At 3 o'clock the Red squadron sighted the west squadron, which intended to unite with the Danzig coast squadron. The entire Red fleet immediately advanced to the attack, opening fire at a distance of about 4,000 yards and under full steam forced a well-directed close fight, during which the Red torpedo boats were conspicuously successful. The coast squadron attempted to go to the assistance of the west squadron, but so rapid had been the advance of the Red fleet and so close the fighting that victory was awarded to the Red before it was able to arrive.

During the night the sea was swept from the coast by means of search lights and fire balls in order to discover any approach of Red. From the fleets signal rockets rose and reflectors were busy in order to secure themselves against the attacks of torpedo boats.

SITUATION ON SEPTEMBER 13.

The situation on the morning of the 13th was as follows:

The coast squadron effected a junction with the west squadron. The entire Red and Blue fleets maneuvered for an engagement.

A naval battle was fought beyond the range of the coast batteries, during which the Red battle ships in keel line broke through the line of the Blue fleet. A number of ships were declared disabled during the engagement, those of the Blue being sent into the harbor at Neufahrwasser. The Blue was awarded the victory and the Red fleet retired in a northeasterly direction.

On September 14 the emperor ordered all the flags of the fleet at half-mast. The United States flag at the mizzens was also at half-mast.

SITUATION ON SEPTEMBER 16.

The following was given out as the war situation on September 16:

BLUE.

By the evening of September 16 the seventeenth army corps and cavalry division B had completed their concentration at Danzig, under cover of outposts on the Radaune and to the east of Danzig.

The eleventh cavalry brigade, which on September 12 had advanced over the Weichsel at Dirschau, discovered the advance of a hostile cavalry division followed by strong columns of hostile troops of all arms marching toward Elbing, Stuhm, and Nikolaiken. On the 14th it retreated by Dirschau toward Sobbowitz, when the opposing cavalry division after a short combat captured the crossings of the Weichsel at Pieckel and Mewe. On the 16th the brigade retreated behind the Radaune at Straschin.

The two Blue fleets succeeded in uniting on the 13th. The defeated Red fleet was pursued in a northeasterly direction. A part of the Blue fleet, including the ships which had suffered damage, went to the road of Neufahrwasser.

RED.

The first army corps on September 16 reached Weissenberg with its thirty-seventh infantry division and Johannisdorf with its second infantry division. Advance guards were pushed forward on the left bank of the Weichsel toward Gr. Gartz and Mewe. The first infantry division was assembled at Stuhm under the protection of its outposts in the direction of Marienburg.

Cavalry division A had from the 12th been in touch with the enemy's cavalry patrols. On the 14th it crossed the Weichsel at Pieckel and Mewe and by the 16th forced a cavalry brigade, which had retreated from Marienburg by

Dirschau, behind the Radaune. On the evening of the 16th it will be in the vicinity of Kladau–Kl. Trampken.

The Red fleet was defeated on the 13th and being pursued by a part of the Blue squadron was compelled to retreat in a northeasterly direction.

INTENTIONS FOR SEPTEMBER 17.

BLUE.

The seventeenth army corps will begin its advance as follows:

Cavalry division B, strengthened by a combined brigade (six squadrons of the divisional cavalry), at 7.30 a. m. from Prangschin via Gr. Trampken, Gardschau toward the line Pr. Stargard–Brust; the thirty-sixth infantry division at 8 a. m. from Straschin via Gr. Trampken, Sobbowitz toward Gr. Turse; the thirty-fifth infantry division at 8.15 a. m. from Gischkau via Woyanow, Suckczin, Uhlkau, Senslau, Lichtenstein, Dalwin toward Liebschau; the forty-first infantry division at 8.15 a. m. from Praust via Hohenstein toward Liebenhof.

RED.

Cavalry division A will stand in readiness between Katzke and Gr. Trampken. The Kladau crossings near Kladau and Gr. Kleschkau will be occupied by one squadron each.

The first army corps will complete its crossing of the Weichsel and Weissenberg and Mewe, where by the morning of the 17th pontoon bridges will have been established.

The advance march will be continued by the first infantry division via Kl. Falkenau, Gremblin, and Subkau toward Gnieschau; by the thirty-seventh infantry division via Gr. Falkenau, Rauden, and along the railroad via Dom. Rathstube toward Swaroschin; by the second infantry division via Mewe, Pelplin, and Raikau toward Zduny.

The line Gr. Gartz–Pelplin will be crossed at about 5.45 a. m.

EVENTS.

On the morning of the 17th the divisional cavalry of the Blue corps joined cavalry division B, and the reenforced division proceeded south at 7.30 a. m. from Prangschin along the high road Gr. Saalan, Gr. Kleschkau, Gr. Trampken, Gr. Golmkau. The infantry divisions of both corps marched at the hours and in the directions indicated under the heading "Intentions for September 17."

The order of march of cavalry division B was as follows: First, the Leib hussar brigade, as advance guard, followed by two batteries of horse artillery; second, the fifty-fifth cavalry brigade; third, the eleventh cavalry brigade; fourth, the provisional brigade (two regiments of divisional cavalry); altogether, 38 squadrons and 2 batteries of horse artillery.

The commander of cavalry division A, Lieutenant General Hagenow, decided to select a favorable position for checking the advance of the Blue cavalry as it debouched from the North Sobbowitzer forest. His division was composed of 3 brigades (24 squadrons), 2 batteries of horse artillery, 2 abtheilungs (batteries) of machine guns, and 1 bicycle company. The following dispositions were made by the Red: One squadron with bicycle and pioneer detachments were sent forward to each of the two brigades over the Kladau at Gr. Kleschkau and Kladau. The Kladau brook formed a natural obstacle and could only be readily crossed by cavalry in the vicinity of the march over the two bridges.

The main cavalry force of the Red was formed in line of regiments, in columns of squadrons, west of the road halfway between Gr. Trampken and Gr. Golmkau, with the batteries of machine guns on its east flank near the high road, and the two batteries of horse artillery on its west flank, on a well-selected knoll near the forest.

The advance guard of cavalry division B found the way barred at Gr. Kleschkau. The Red pioneers had placed a large wagon across the road at the north entrance of the bridge, and the squadron of the eighth uhlans on guard there dismounted and with the bicycle detachment opened fire from concealed positions. They developed the strength of the advance guard and caused one Blue battery to go into action. The position of the Red was finally charged by the first hussars. The Red squadron, which did not succeed in mounting in time, was put out of action for the day, the bicycle detachment escaping through the forest.

Cavalry division B then proceeded at a rapid gallop along the high road through the dense forest, and when it debouched its batteries went into action immediately south of the forest. They here ineffectually fired at small detachments of the Red at great distances. Cavalry division B then continued its advance. The Red patrols were now clearly visible, and the Blue commander, Lieutenant General Prince Leopold, began to deploy his division, which had emerged from the forest. The artillery sought position on a most favorable hill overlooking the open ground between the two divisions. On the map this hill is near the place marked "Erbbegräbuiss." It constituted the commander's hill, from which the emperor observed the cavalry battle. The ground was well suited for the employment of large cavalry masses. When the Blue artillery in column formation was trotting up the hill, the Red machine-gun batteries from a concealed position opened an unexpected and most energetic fire full into its flank, firing 10,000 shots at a distance of about 900 yards. The machine guns had been taken off their carriages, carried into position by hand, and were served, as is habitually done, by cannoneers lying down, the horses and carriages being concealed in rear. The Red artillery also opened a rapid fire upon the Blue artillery before it could come into action, and rendered the latter unserviceable. It was soon after charged by a squadron of the twelfth uhlans, when it rapidly disappeared to the rear. Prince Leopold was deploying his cavalry at the time for a charge, the Leib hussar brigade on the right, the thirty-fifth brigade in the center, the provisional brigade on the left, and the eleventh brigade in rear of the center. The Red cavalry was already formed waiting for the signal to charge. When the Blue artillery had been disabled, the Red artillery opened a heavy fire upon the deploying Blue cavalry, and the Red machine guns fired fast into the approaching Blue line. None of this fire could be responded to. It compelled the Blue to charge before its line could be perfectly formed, thereby losing the effect of its mass shock. The brigades advanced from the right in echelon, not from choice, and charged as soon as possible. The Red cavalry division massed its main force on its left wing, and compactly charged the right two-thirds of the Blue line. The Red artillery partly enfiladed the Blue as it advanced, and the machine guns fired directly into the line. The two charging lines halted opposite each other almost perfectly at 15 paces, the natural place for horses to stop when opposed by unbroken lines of lances. The left regiment of the Red, being unopposed by cavalry, charged the machine guns, which were directly in its front, and passed through the intervals. The umpire having decided that the entire Blue line was repulsed, this regiment was compelled to retire and was fired upon by the machine guns while in retreat. The victory was given to the Red on account of its superior fire and the compact charge of its cavalry. The Blue cavalry division was regarded as out of action for the day. The Red cavalry, therefore, from 10 a. m. had a free field in which to develop and reconnoiter the advance of the Blue infantry divisions. It materially assisted its own infantry divisions in their preparation for contact.

The infantry divisions of the two corps approached each other during a rain storm and finally bivouacked with their outposts within gunshot, in a section formed by the valleys of the Weichsel, Mottlau, and Spengawa; the outpost line extending from the Weichsel near Czattkau southwest by Spangau, Goschin, and Demlin. The positions are shown on the map.

At about 8 a. m. on this date, the 17th, it commenced to rain, and continued to do so almost uninterruptedly throughout the day, the following night, and part of the next day. On this account, and owing to the heaviness of the ground, the emperor ordered a suspension of the maneuvers of the army until the morning of the 19th, and also that the troops go into emergency quarters (close billet). The outposts were therefore withdrawn, and every house and place of shelter that the country afforded for man or horse were occupied. The first division was sheltered in the town of Dirschau, while the others sought quarters east of the Weichsel and in the various villages near the maneuver grounds. The emperor himself abandoned his intention to bivouac with the cavalry and returned to his quarters on board the *Hohenzollern*.

On September 18 the landing force of the Blue fleet proceeded for the purpose of reenforcing the Blue army. This force was formed from the crews and marines of the Blue ships, especially those that had been disabled and sent into the road of Neufahrwasser and from the first ersatz Blue marine battalion. It consisted of about 2,000 men and was commanded by Admiral Prince Henry; it had already participated on land in the parade, inspection, and review of the seventeenth army corps at Danzig.

On each ship the crew for landing purposes was organized into infantry, artillery, and pioneers. The infantry carried the latest infantry rifle, model 1898. The pioneers were taken from the machine personnel. The artillery had charge of the machine guns and machine cannon. The force had twelve machine guns. They were drawn by the men on light two-wheeled carts with shafts, by means of straps which were placed over the shoulders. In firing they were put on tripods. Twelve machine cannon were also taken. They were drawn by a span of horses, each horse being led by a sailor. Two horses were sufficient for the cannon on solid ground without ammunition. The cannon works automatically and delivers 300 shots per minute. The barrel works laterally, over a considerable angle. The projectile is a percussion shell weighing 450 grams. The caliber is 3.7 centimeters. The barrel has a water jacket with a steam outlet tube. The cannon was carried on the landing carriage of the quick-firing 6-centimeter cannon, for which a limber has been arranged to be drawn by two horses and which is carried on board. This is the first time the Germans have employed this cannon on land. In China they were very effective against the Taku forts on board the *Iltis*, but were then, of course, on a different carriage.

At Neufahrwasser the landing force was placed on requisitioned Weichsel River boats, which, though covered, were open on the sides. Sixteen boats were used for the transportation of the ship crews, four boats forming a tug train for a small steam tug. The marine infantry occupied six additional boats, which were also towed. Prince Henry and staff were in a special small steamer. The force proceeded up the Weichsel and landed near Güttland, the journey occupying the entire night of the 18th. The landing was completed at 6 a. m. Horses were taken for the superior officers and their staffs, who were mounted during their participation in the remainder of the maneuvers

SITUATION FOR SEPTEMBER 18.

The following war situation for September 18 was given out on the morning of the 19th:

BLUE.

Cavalry division B in its advance on the morning of the 17th was checked for a short time at the Kladau crossing near Gr. Kleschkau by bicyclists and dismounted uhlans of the enemy. It then advanced through the Sobbowitzer forest against Gr. Trampken. In its deployment it was attacked by a hostile cavalry division and decisively defeated. It bivouacked in the evening near Gardschau and ascertained that the cavalry of the enemy had retreated in the direction of Czechlau.

The seventeenth army corps, early on the afternoon of the 17th, reached, with the thirty-sixth infantry division, Kl. Malsau; with the thirty-fifth, Liebschau and Rukoschin; with the forty-first, Liebenhoff and Mühlbanz, where they went into bivouac.

An attempt of the forty-first and thirty-fifth infantry divisions to take possession of the Mottlau crossings, northwest of Dirschau, was prevented by hostile troops of all arms who occupied the hills near Peterhof.

A telegram from the principal headquarters announced that the tenth infantry division had assembled near Gr. Liniewo and would enter Pr. Stargard on the evening of the 18th, to be at the disposition of the seventeenth army corps.

RED.

Cavalry division A, on the morning of the 17th, attacked a cavalry division of the enemy debouching from the Sobbowitzer forest, southwest of Gr. Trampken, and decisively defeated it. Later it was obliged to retire in a southerly direction before the stronger columns of the enemy, of all arms, which advanced via Gr. Trampken against Sobbowitz, and via Suckczin against Senslau.

The first army corps, at daybreak on the 17th, crossed the Weichsel on pontoon bridges near Weissenberg and Mewe, and at about 11 a. m. the first infantry division reached Schliewen, occupying the Mottlau crossings; with the thirty-seventh infantry division, Swaroschin, and with the second infantry division, Zduny.

When at 11 a. m. a strong hostile column of all arms advanced from Mühlbanz against Liebenhoff, the first infantry division engaged it in the environs of Peterhof.

The enemy deployed his infantry from Spangau, but the attack was successfully defeated.

The first army corps bivouacked with the first infantry division near Schliewen; the thirty-seventh near Swaroschin; the second near Zduny.

Cavalry division A went into bivouac near Czechlau.

INTENTIONS FOR SEPTEMBER 19.

BLUE.

The seventeenth army corps will attack the enemy.

The advance will be as follows: The thirty-sixth infantry division (less four battalions, one machine-gun battery, three field batteries) from Goschin via Ludwigsthal against Kl. Watzmirs; the thirty-fifth infantry division from Zu Liebschau (west of the northern point of the Liebschau Lake) by the narrow lake against Gnieschau; the forty-first infantry division (less three battalions, three batteries) from southeast of Liebschau against Rokittken.

One infantry regiment and one battalion of artillery will remain near Spangau and Liebenhoff to protect the crossings. There is at the disposal of the commanding general, near Zu Liebschau, west of the Liebschauer hills, four battalions, one machine-gun battery, and three field batteries.

Cavalry division B, increased by eight squadrons of divisional cavalry, will advance from Liniewken via Gr. Watzmirs against the left flank of the enemy.

The tenth infantry division will advance via Liniewken against Swaroschin.

RED.

The first army corps will attack on the morning of the 19th, encircling the enemy from the left. It will advance as follows: The first infantry division from Schliewen via Ludwigsthal and Goschin against Rukoschin; the thirty-seventh infantry division from Swaroschin via Liniewken, Wentkau, and Gr. Malsau against Gr. Turse; the second infantry division from Zduny, on the east edge of the Zdunyer Lake, via Gr. Borroschau against Kl. Turse; cavalry division A, from south of Zygowitz against the flank and rear of the enemy.

The Mottlau section from Dirschau to the road Schliewen-Liebschau will be barred by detachments consisting of four battalions, one platoon of cavalry, and six batteries.

EVENTS.

The outposts were ordered to be reestablished, and the troops to be in the positions abandoned, by 6 a. m. on the 19th.

The movements, excepting for the landing force of the navy, were not to commence until 8 a. m. The outposts were abandoned during a very dark rainy day, and when reestablished they were found to be in places very near each other. Desultory fighting began at 6 a. m. The thirty-sixth infantry division, at Goschin, at 6 o'clock found strong Red outposts of the thirty-seventh infantry division holding hills controlling not only its outposts but part of its main position. It was therefore compelled to move in some direction and, having decided to go forward, it attacked the position of Red with two brigades of infantry and a regiment of artillery, driving the latter south of Ludwigsthal.

The thirty-fifth infantry division also began the fight early for the same reason, making an artillery attack against Rokittken and Peterhof. The Blue commander did not intend these attacks to be made, until the tenth infantry division had reached the environs of the Zdunyer Lake; the landing force of the navy, which had marched from Güttland south at 6 a. m., the environs of Dirschau; and the forty-first infantry division, which would be about three hours later. It now seemed apparent to the Red commander from the attacks of the Blue on the front and the east flank, that a continuation of the encircling movement he had ordered against the west flank of Blue would leave his line of communication and his pontoon bridges over the Weichsel exposed. In case of defeat his retreat would be difficult, and his army endangered by being driven against Zdunyer and Spengawsker lakes. By prematurely attacking, the Blue had revealed its intention of seizing the crossing over the Mottlau–Spengawa. The Red commander now changed his orders for an attack against the right wing of Blue and ordered a retreat to the line Spengawsken, Gross Watzmirs, Felgnau.

The thirty-sixth Blue infantry division thus became involved in an attack against the thirty-seventh Red infantry division, the latter having one brigade near Ludwigsthal, one southwest of Neumuhl, and its artillery northeast of Swaroschin. The entire thirty-seventh infantry division slowly retreated after heavy fighting toward Gr. Watzmirs at 11 a. m. The Blue did not advance beyond the southern edge of the Swaroschiner forest. The first infantry division also retreated in the same manner before the thirty-fifth via Gnieschau toward Felgenau, which it reached about 9.30 a. m., less the troops which had been near Schliewen and opposite Spangau. These retreated via Czarlin to Subkau.

The second Red infantry division received information of the advance of the Blue from Goschin and from northeast of

Pr. Stargard. It prepared to attack the thirty-sixth infantry division, but under order of the Red commander retreated via Zduny to Bresnow, leaving two battalions and a machine-gun battery to bar the narrows of Lake Spengawsken and sending one battalion to Riewalde. The division reached Bresnow at about 9.30. The brigades were echeloned from the right, one being north of Bresnow and the other southwest, with the artillery between the two brigades. Its commander guarded equally against an attack via Spengawsken or Riewalde from Pr. Stargard.

In the meanwhile the landing force under Admiral Prince Henry had marched up the Weichsel, driving the Red outposts from Dirschau and the vicinity of the river. The Red corps had now succeeded in withdrawing its various divisions without great loss. Only the thirty-seventh infantry division and the detachments of the first infantry division, which had fought at the crossings of the Mottlau, west of Dirschau, had suffered severely; the latter losing half of their artillery. The remainder of the artillery of the first division had received serious punishment at Rokittken, when it was obliged to oppose superior batteries of the forty-first and thirty-fifth infantry divisions, in order to cover the retreat of its own infantry.

When the landing force had nearly reached Dirschau the forty-first infantry division advanced across the Mottlau near Rokittken. The crossing was made on eight bridges constructed by the pioneers, one of which was used for artillery. One regiment of infantry and one battalion of artillery of the forty-first infantry division, which had advanced by Lunau, reenforced the landing force. For the remainder of the maneuver they were under the command of Admiral Prince Henry. One infantry regiment of the forty-first infantry division was drawn off into a fight with the thirty-fifth infantry division, only one brigade and the artillery of the division therefore advanced at first between Czarlin and Gnieschau.

Later on, the regiment resisting the thirty-fifth infantry division followed and acted as a reserve to the left wing of the division. The forty-first division was in touch on the left with the landing force, advancing via Czarlin against Subkau, and on the right with the thirty-fifth infantry division, which had deployed for attack east of Kl. Watzmirs. As the thirty-fifth infantry division did not advance with its right wing against Kl. Watzmirs, as seemed to be expected, but farther to the east, there was an interval between the thirty-fifth and thirty-sixth divisions, which were advancing to attack. The Blue commander filled this interval with a reserve.

The tenth infantry division began its march at 8 a. m., as ordered, via Kokoschken, Czechlau, and around the northern point of the Zdunyer Lake via Liniewken against Swaroschin. At 7 a. m. cavalry division B (Blue) was near Liniewken and cavalry division A (Red) near Czechlau. The latter was ordered to veil the advance of the second infantry division and to advance against the flank and rear of the Blue. It advanced at 7.30 a. m. via Zygowitz against Bojahren, where strong hostile cavalry patrols had been reported. During its advance it received information that the Red army corps had retreated before a superior force. As the head of the division emerged from the forest south of Bojahren it discovered cavalry division B in full force, with artillery, west of Borroschau. The Red commander declined battle and withdrew through the forest toward Czechlau.

Upon arriving near the latter place, the divisional cavalry belonging to the advance guard of the tenth infantry division was discovered at the north edge of the Spengawsker forest, southwest of Czechlau. They deployed as skirmishers and soon artillery emerged from the forest. The batteries and machine guns of cavalry division A deployed on the height 104, northwest of Czechlau. Part of the Red cavalry now dismounted to fight on foot, the lances were left sticking in the ground near the horses, and the troops deployed on an excellent position to attack the infantry as it emerged from the forest.

One brigade remained mounted east of Czechlau. The Red artillery and machine guns fired upon the Blue artillery during its deployment, the machine guns at close range. So energetic was this fire that the Blue artillery was put out of action. The divisional cavalry was also driven back. The Blue infantry now entered into the fight. The position of the Red commanded the open ground along the edge of the forest. The Blue artillery could not be handled in the wood. A machine-gun battery of the Blue went into action and was very effective. The Blue advanced heavy infantry forces, the action became general and the result doubtful, when the Blue suddenly withdrew into the forest, it having been ordered to give up its march to Liniewken, to proceed eastward at once and to assist in the attack on the main position of the Red. Just at this time the advance brigade of cavalry division B from the north had left the forest near Zygowitz to assist in the attack.

The artillery and machine guns of the Red now turned upon the new enemy, and the Blue brigade, which was unsupported, was driven back into the forest. Meeting the remainder of its division the brigade reformed and the entire Blue cavalry division in superior numbers advanced to attack. The position of Red artillery and machine guns on the height 104 was an excellent one to resist an attack from the north. A general cavalry engagement now ensued in which cavalry division B was defeated and withdrew via Wentkau to Liniewken. Cavalry division A then marched toward Zduny to attack the rear of the right wing of the main Blue army. Upon withdrawing from the engagement with cavalry division A the tenth infantry division marched toward Zduny. When it arrived at the eastern edge of the Spengawsker forest it found the narrows between the lakes barred by Red infantry, with one battery of machine guns and behind these stronger forces in the environs of Bresnow. After an engagement between infantry, artillery, and machine guns opposite Spengawsken and at the narrows northwest of Zduny, the Red retreated to its principal position. The tenth infantry division, having gained the narrows, advanced and deployed its infantry between Zduny and Spengawsken and its artillery directly in rear of its infantry. It failed to bar or guard the narrows near Zduny.

The second infantry division (Red) checked the tenth infantry division, the Red artillery being in good position between Bresnow and Riewalde.

The Blue commander now decided upon an assault, his line being united, excepting an interval of nearly 1 mile between the tenth and thirty-seventh infantry divisions.

In the assault the lines were opposed as follows from west to east: On the extreme west wing the tenth infantry division was engaged with the second; then an interval; next the thirty-sixth infantry division opposed the thirty-seventh; next the thirty-fifth (with its artillery on its wings) southwest of Gnieschau, the forty-first northwest of Felgenau, and the landing force, strengthened by one regiment of infantry and a battalion of field artillery, near Subkau, all attacked the first infantry division. The landing force turned the east flank of Red.

The Blue made a determined assault all along the line, the landing force rolling up the right flank of Red. On the left, cavalry division A had passed through the narrows near Zduny and deployed southwest of Zabagno. Its artillery and machine guns being well established, gave good support to a heavy attack by Red cavalry on the rear of the Blue line, near Zduny. This sudden attack compelled the detail of a strong infantry and artillery force from the main Blue fighting line before the attack of cavalry division A could be checked. This enabled the second infantry division not only to resist its attack, but also to undertake an attack against Spengawsken. This attack not being successful, the division withdrew one brigade to Klonowken and the other to Raikau. The first infantry division about 12.15 p. m. was forced to retreat, it being so driven that the east flank of the Red line was gradually doubled back on the line of the thirty-seventh infantry division.

A counter attack of the thirty-seventh infantry division at Gr. Watzmirs was defeated, and the thirty-fifth and thirty-sixth divisions advanced victoriously. The greater part of the right and center of the Red corps was disabled or captured. The victory of the Blue was decisive. Of the Red army only the second infantry division and cavalry division A were intact and in a position to retreat.

At 1 o'clock the signal balloon of the maneuver direction signaled "March home for stations," and the maneuver was ended.

REMARKS.

The "Field Service Regulations of 1900," now in force, were observed during the maneuvers; the rules for the guidance of umpires, being the same as last year, are not repeated. The umpires included many officers of high rank. In addition to the emperor, they consisted of one field marshal, six generals, three lieutenant generals, six major generals, a large number of subordinate officers of the general staff, and officers whose organizations were not participating in the exercises. The umpires wore a white band on the arm and also white helmet covers.

The actual duration of important contact for the army was only two days. The agricultural conditions in the vicinity of the maneuver grounds were not good. The crops, on account of a scarcity of rain, had partially failed in the provinces of East and West Prussia. The maneuvers, which in recent years have usually occupied five days, were fixed at three through consideration for the inhabitants, who had but limited supplies. Only once before, in 1899 in Wurttemberg, the maneuvers on account of the weather were limited to four days.

SICKNESS.

There was one death from typhoid, twenty sick were admitted to the hospitals, and forty men were returned to the garrisons with sore feet. This is a small percentage considering the unfavorable weather and the fact that the first army corps had marched eight days to reach the maneuver field, averaging 23 miles per day. Impure water had caused much sickness in some of the guard brigades during the division maneuvers. On this account examinations and detailed reports were ordered made, just previous to the kaiser maneuvers, of the water in the rivers, lakes, brooks, ponds, springs, wells, etc., also an exact statement of the water conditions of all the cities, villages, and farms lying in the entire maneuver field. The statements included the number of public and private wells, pumps, etc., in each community, the quantity of water the latter gave, the length of the time required to restore water exhausted, the relation the quantity bore to the requirements of the community, the amount of water that could be taken besides the usual or necessary consumption of the inhabitants, and whether the water was drinkable for men or horses. There was also established a special water service under the charge of sanitary officers. Besides the recently adopted light one-horse water wagons of the train park, water was transported on requisitioned wagons in spirit barrels. Much of the water was found to be unfit for use. Square wooden frames with placards were placed upon posts throughout the country showing where water was to be had and its condition. On these signs there often appeared the words "not drinking water," "to be used only after boiling," etc. Over sources of very impure water sentinels were established. It is probable that these precautions account for the very small percentage of sick during the kaiser maneuvers. Much typhoid existed at the time in the valley of the Weichsel. Houses containing typhoid were placarded.

When the men called from the reserve and landwehr join for the maneuvers they are issued new boots. Until this year they marched for the maneuvers directly after receiving them, in consequence of which sore feet became so general in their organizations that a large percentage of the men were disabled. This year they were called in several days before starting for the maneuvers, and the boots were issued to the men immediately after reporting; they thus became accustomed to them, and the percentage of men with sore feet was not only less than in any previous year, but was so small as to be of no concern. The German soldiers wear socks or foot rags, and their feet are frequently inspected.

UNIFORMS.

The two parties in the maneuvers are always designated the Red and the Blue. The Red, being the attackers, wore khaki-colored covers over their helmets. All officers and soldiers wore helmets and their regulation uniform, with the trousers stuck in the boots.

There is a great variety of uniforms in the German army, some of which are very attractive. Among the most impressive, perhaps, are the uniforms of the first and second hussars, "Death Hussars," which are black with white trimmings, and on their busbies are placed skulls above crossed bones. The first are mounted on white horses and the second on dark. The former have white pennons on their lances with a skull and bones in black, the latter black pennons with skull and bones in white. Their uniform is said to be founded upon the tradition that these regiments formerly neither gave nor received quarter. The two regiments form a brigade. The emperor wore the uniform of the first at the Danzig parade and led the regiment past the reviewing stand.

TRANSPORTATION.

The instant the order "March home for stations" appeared from the balloon of the maneuver direction, each organization proceeded direct to the place previously designated, without waiting for the higher officers, who assembled near the emperor to hear his critique. Sixty thousand men and 7,000 horses were transported from the maneuver grounds by rail to their garrisons. The remainder marched. Sixty-five special trains with 6,000 cars were in waiting. The troops were entrained at nine different points, situated in a relatively close district, as follows: Sixteen trains at Dirschau; 8 at Subkau; 6 at Pr. Stargard; 5 at Hohenstein; 2 at Praust; 7 at Sobbowitz; 6 at Simonsdorf; 14 at Swaroschin and 1 at Narkau. Each train carried about 1,000 men, excepting when horses and guns were transported, when not so many men were taken. After the trains in waiting had left, 55 additional trains arrived, so that altogether 120 trains were used. The entrainments were made without any essential interference with the regular passenger and freight traffic and without an accident in about twelve hours, from the afternoon of the 19th up to the morning of the 20th of September. The stations were electrically lighted by electric-light cars, by means of which a quicker and safer loading was effected. Much may be said in favor of the efficiency of the German state railroad service, especially as the transport of the troops referred to was made from a province where few railroads exist, and at the same time it fell in with the transport of large numbers of troops in west and south Germany returning from their various corps maneuvers to garrisons, whereby the demands for transportation might be expected to be made difficult.

The landing force of the navy returned down the Weichsel to their ships near Neufahrwasser in the same boats and in the same manner as they were brought to the maneuver grounds. The return journey occupied the night of the 19th.

FOOD.

The large permanent magazine at Danzig, capable of holding two and one-half millions bushels of grain, was used, also the one at Lichtenstein. For maneuver purposes temporary magazines were also established at Dirschau, Zeisgendorf, Czarlin, Swaroschin, Gr. Turse, and at numerous railroad stations and crossroads. Tents were generally used for these magazines, but sometimes houses.

The maneuver direction, having absolute control of the two opposing sides in the exercises, arranges the problems in such a manner as to cause the maneuvers to take place in the exact locality desired. It is, therefore, a comparatively easy matter to arrange the magazines in the most convenient places. The duration of the maneuvers being also fixed beforehand, the approximate quantities of supplies necessary may be closely calculated. The unusually heavy rains this year, however, damaged some of the supplies. Effort was made on account of the economical conditions and the sparsely inhabited country in the maneuver fields to supply as great a proportion of rations and forage as possible through the system of magazines. There were many field ovens established several days before the maneuvers, some of which worked six shifts and had a capacity of 1,000 loaves per day.

For transportation there were 11,000 horses with wagons requisitioned from the country. During the maneuvers a citizen must furnish his wagon, horses, and himself when required. This transportation was secured by calling upon the civil authorities of the two provinces, who arranged for it. Some of the vehicles were obtained quite a distance from the scene of operations.

As a rule, in Germany, officers, enlisted men, and horses are billeted upon the country in which the concentration, march, or maneuvers take place. When the first army corps was concentrated at Königsberg and on the 17th at Danzig, the troops, accepting the regular garrisons, were billeted, as was also the first army corps, during the eight days' march to the maneuver ground. The billeting was arranged through the civil authorities. In a city or village the mayor, or in the country the house owner, was simply notified of the number of men and horses to be provided for. For quarters with board a daily price of 20 cents per man is paid by the government. A house proprietor in ordinary march quartering, when notified to provide for troops, may hire the necessary boarding places if in every way suitable. These cantonment places often sold as high as 60 cents. Ordinarily it is a matter of pride to treat cantoned soldiers hospitably and generously. The troops are to a great extent the guests of the country through which they march or operate. When the maneuvers were over the emperor thanked the people of the province of West Prussia, through their governor, for their very hospitable and courteous entertainment of the troops. When the close quartering of the troops was ordered on account of the rain, many were obliged to bivouac as their was not sufficient shelter for them in the vicinity. The supply of wood and rations was abundant, as it was expected that all of the troops would bivouac.

The discipline of the army is excellent. When the troops were scattered through the towns and villages in cantonment, often in places where there were no officers and sometimes no noncommissioned officers present, offenses against the citizen, excesses of all kinds, and drunkenness were almost unknown.

CAVALRY.

The absence of details from the cavalry was noticeable. Each corps had one squadron of mounted orderlies with a distinctive uniform; they were never employed closed as a squadron for fighting purposes, but having been trained for the report service, were distributed as mounted orderlies to the various headquarters and were used for the news service in general.

Bicycle and automobile detachments in addition assisted in this service, but on account of the heavy ground and mud, the mounted orderlies were used almost altogether away from the roads.

The Blue corps gave its divisional cavalry to reenforce its cavalry division after the reconnoitering period and near approach of the opposing forces, while the Red infantry divisions retained their divisional cavalry. The commander of cavalry division A had for a long time commanded the cavalry of the East Prussian corps, the different regiments had often maneuvered together and were well acquainted with each other and with their commander; while in cavalry division B a new commander and several new regiments were assigned immediately preceding the maneuvers and the division had never previously maneuvered together as a whole.

The average weight of the cavalry pack, including arms, is 80 pounds.

A few of the patrols used in their early reconnoissances the Rey lance boat, made from 12 to 16 lances fastened by the aid of tie-pieces (braces) of hollow steel, the framework being covered with tarred cloth laced on the lances by means of the feeding lines. Bundles of lances united two boats to each other. At the ends of the lances were fastened, by a simple arrangement, light wooden shovels which constituted the oars. The weight of the braces of hollow steel for one of these boats is 45 pounds; the waterproof cover 25 pounds, total 70 pounds. One horse will easily carry the necessary material for several boats. The boat can be put in the water in ten minutes. This boat could easily be used by cavalry not armed with the lance by the formation of a light steel frame (to take the place of the lances) that could be disassembled and packed on the horse or mule that carried the waterproof canvas.

ARTILLERY.

In the German field gun and the field howitzer the recoil is checked by a wheel brake and by a spur at the end of the trail. No guns with hydraulic check for recoil were used. It is very doubtful whether heavy guns with hydraulic mechanism for checking recoil and with armor shields for protection, could have been maneuvered so successfully in the heavy mud caused by the rain.

As a result of assigning all of the artillery to the divisions, it has become more than ever the "sister arm" of the infantry, and being mobile and light it acted hand in hand with it.

All of the batteries cooperated in the action from the beginning, and when the opposing infantry was too near to be a practicable target the guns generally managed to fire over their own infantry at the enemy's guns in rear.

The ground as a rule afforded many good positions for artillery. There were, however, but few changes of position, the increased range of the modern infantry rifle holding the artillery at a distance. The positions first taken by the artillery were generally used until the end of the action.

INFANTRY.

The German infantry rifle weighs 7 pounds 12½ ounces. The total weight of piece and pack averages 60 pounds.

The reservists and landwehrmen called in, while perhaps not as accustomed to drill as the active army, had the steadiness of older men and it was difficult to note any difference, either at the ceremonies or maneuvers, between the temporary battalions and those with the colors.

The East Prussian corps may be said to be the parent and nucleus of the German army and its province has given its name to the Prussian Kingdom.

PIONEERS.

The pioneers constructed pontoon bridges over the Weichsel near Weissenberg and Mewe. Besides the bridge train of the first army corps, which was not sufficient for this purpose, additional bridge material from Grandenz was furnished. It was calculated that it would take ten hours for the construction of these bridges, but on account of the very favorable water conditions they were completed in seven. These and the bridges over the Mottlau already mentioned were the most important constructions of the pioneers.

MACHINE-GUN BATTERIES.

A new permanent organization was this year added to the German army, officially designated as the "machine-gun abtheilung" (battery). The organization most suitable for the battery, the necessities for its existence, as well as the kind of troops with which it should serve, is regarded here as no longer a matter for experiment. It has been proven to be of equal serviceability with cavalry or infantry.

Each battery is composed of 1 captain, 2 lieutenants, 9 noncommissioned officers, 1 of whom is a blacksmith, and 1 an armorer; 58 privates, and 43 horses. The material consists of 6 machine guns and 2 ammunition caissons.

The new organization attracted attention at the commencement of the maneuvers by disabling the Blue horse artillery in the opening cavalry battle at Gr. Trampken, and frequently throughout the maneuvers the peculiar rolling fire of the machine guns distinctly impressed one with the idea that there was a new weapon on the field to be reckoned with. The infantry service cartridge is used, the barrel being the same as in the infantry rifle, only it is provided with a large steel water jacket of bronze color. Extra cans of water for cooling purposes are also transported in the gun-carriage boxes and caissons. The breech mechanism is extremely complicated. The gun is mounted on a gun-carriage frame connected with an ammunition limber, so that it has the appearance of a small cannon. For use the frame was taken off the carriage and carried by two men to the firing position. The gun and its ammunition upon a separate frame with runners may be each dragged a short distance by one man. On account of the great rapidity of fire the barrel and the breech mechanism are subject to considerable wear and tear, and individual parts frequently become unserviceable. On this account each gun has a great number of reserve parts of breech mechanism and barrels. The field serviceability of the piece depends in a great degree upon the ability to exchange the damaged parts speedily and without difficulty. The numerous reserve parts and the great number of cartridges which must be conveyed with the gun give the whole considerable weight, so that the carriage is drawn by four horses. In driving the gun stands on the carriage, and two operating men ride on the axle seats and three on the limber. The gun may be fired from the carriage, but it is expected that in entering into a fight it is taken off and carried, the horses, drivers, and carriages remaining back, if possible, behind cover. During the firing the barrel is turned laterally by means of a ball joint. As it was operated by men lying down, and the gun itself being very low, it offered a small target. When well established it was difficult to see from a distance of 800 to 900 yards. This is an essential advantage over a line of 300 infantrymen representing about the same firing power, which can not be so readily concealed. The machine guns occupied but little room, and a very strong fire effect was thus obtained from a small space. They were shown to possess also much greater mobility than infantry, and quickly occupied important points where cavalry and artillery were not sufficient.

While the machine gun is not expected to replace either cavalry or infantry, it is believed in Germany to be an arm which, if properly used, promises to be of great fighting value. It is intended to continue the establishment of these permanent batteries until one for each corps is organized. At present only five batteries are provided for in the budget as permanent, but there are many others established by details of men from other organizations. Most of the latter have only four guns.

The maneuvers illustrated the great advantage to cavalry of having machine guns. Near Czechlau by their fire power they replaced infantry and gave the cavalry stability, enabling the latter to enter into battle upon equal terms with an infantry division of superior numbers.

WIRELESS TELEGRAPHY.

Wireless telegraphy (Marconi system) stations were established in Danzig on the steeple of the Marien church, in Dirschau on the steeple of the Catholic church, in Danzig bay on board of a Blue war ship, and on the maneuver ground on several church steeples.

Several small balloons were also used on the maneuver ground for wireless telegraphic experiments. The issuing apparatus for this purpose was not placed in the basket, but rested on a carriage below the balloon, being connected with the balloon by a copper wire which unrolled easily. The small balloons are easily transported and can be utilized when a steeple on which to establish a station can not be found. They were worked by the telegraph troops.

OPTICAL SIGNALS.

Flash signals have become quite important and useful for the maneuver direction, as well as for the rapid communication between different parts of the field armies. The stations were established on the heights on the maneuver ground. The flashes were made by a new light invented by Knoffeler, a German chemist. This light, which results from a mixture of oxygen and acetylene, is three times more intense than the Drummond light; it can readily be seen up to 5 miles during a bright sunlight and 10 miles during the night. The necessary oxygen for the light is obtained by the aid of a chemical mixture contained in a metallic retort carried on a leather belt by the signalman; the gas is collected in a rubber balloon and is easily transported. Not a single optic message failed during the maneuvers.

FIELD TELEGRAPH.

Lines were established as follows: By the maneuver direction; by each of the two commanders for use on the maneuver field, as lines of communication, and by the cavalry. Thus, the first army corps had constructed on September 16 a line from Stuhm via Pieckel to Kl. Falkenau. Cavalry division A established a line from the latter place to Gr. Trampken. The detachment of the first infantry division sent against Marienburg was also connected with Stuhm. On the 17th there was a field telegraph from the headquarters of the Red corps at Kl. Watzmirs to the headquarters of the various Red divisions. All of these lines were connected with the permanent telegraph lines of the country, and the corps lines with the headquarters of the maneuver direction. The wire was carried in small wagons drawn by train horses. The layers seemed very skilled in their work. When no other means were found, the wires were placed in a ditch in such a manner as not to be readily seen. The ordinary Morse code was used.

BICYCLES.

Bicycles were used with success not only in the information service, but also for the conveyance of fighting units. There are no permanent organizations of bicycle troops in the German army. The budget does not provide for any. There are, however, several men detailed from each company for this duty, and when united each corps has a force of 150 bicyclists. They have a special uniform, consisting of a short coat, riding trousers, light laced shoes, and canvas leggings. They are armed with the rifle or carbine, according to the arm of the service to which they belong. Being selected men, their individual capacities are probably as high as could be expected in a permanent organization. The Red and the Blue each had one company, 150 strong, made up of bicyclists taken from regiments not participating in the maneuvers. They were intended as fighting units, as the organizations used in addition their own bicyclists for report and orderly service. The use of the bicycle during the main maneuver days met with great difficulties, excepting on the metaled roads, as the ground was soft and muddy. There is as yet no uniform model of bicycle for the army, which evidently would be of advantage from the point of view of replacing the various parts of the machine. Uniformity, however, was observed in the following particulars: All were strongly constructed, low, provided with pneumatic tires, their parts dark, including the handle bars. There were no folding bicycles that could be carried on the back, they being in disfavor in Germany, as it is claimed that too much time is lost in taking off and unfolding them; besides they are not so firm as the other models.

AUTOMOBILES.

Automobiles for the transportation of persons, automobile freight wagons, and traction engines were used. Ten automobiles of different construction and of different appearance were in service for the conveyance of persons. Of these seven belonged to the government and three were furnished by an Alsace firm for test purposes. The speed varied from 25 to 40 miles per hour. They went from Berlin to Danzig in three days. The record for a day's run on the maneuver ground itself was 194 miles. They all had benzine motors. Some of them carried benzine for a drive up to 312 miles. Several benzine supply stations were established, the principal one being at Dirschau. There has been no particular type adopted for army use. They carried from three to six persons. The shape and size differed very much. Some were small, while others looked like park wagons. Some were covered above and provided with closed windows like omnibuses. They were principally used by the maneuver direction and by the various headquarters. They were confined to the high roads on account of the mud. Several of the tested samples proved to be quite serviceable. In case of war, automobiles may be requisitioned in Germany. There were also two Thornycroft steam freight wagons used, which carried provisions from the magazines to the troops and were very useful, although they had to contend against unfavorable weather, bad parts of road, etc. These freight automobiles, however, undoubtedly need further improvements.

There were also two Fowler traction engines of the Malta pattern, each of which drew three loaded common country wagons. On the roads they operated well in spite of the mud. But when an attempt was made to take the loads to soft bivouac places, away from hard ground, great difficulties were encountered. One "Scotte trakteur" after the pattern in use in the French army was also in service, but it did not work successfully. There were no automobiles used for carrying ammunition to the firing line, for the hospital service, or for guns of any description. None were armor-plated.

CARRIER PIGEONS.

Carrier pigeons were used by both the army and the navy. The former carried their birds in knapsack cages on the backs of the men, while the latter had a much greater number of birds in larger cages. Each pigeon was issued a ration of beans, seeds or peas weighing 30 drams, divided into two portions, one of which was fed during the morning and one during the afternoon. Pure drinking water was also carried for them. The birds when selected for a journey were not fed for a short time before sending them off. Pigeons of one sex only were sent out together. To adjust the message, one man held the pigeon, while a second secured above the foot of one leg a rubber ring. To the ring a rubber tube containing the rolled dispatch was attached. The pigeons were not very young, but strong and not molting. They were started from fly baskets from which they could leave voluntarily.

If they felt unfit and did not leave the basket they were not forced out. They fly better a short time after sunrise, and the safe arrival of the dispatch can be expected only if they are able to reach home before sunset. A large number of birds was sent off with the same dispatch; they never all went astray. Rain, fog, and thunder storms are unfavorable features and it is regarded better not to send out birds during bad weather. When all conditions were favorable the flying basket containing the birds was placed in as free a place as practicable, where the birds would not have to fly against trees, chimneys or obstructions of any kind, good results depending upon undisturbed flight. When the door of a basket was opened two birds would come out and perch themselves on the edge of the basket, and after looking around would start into the air, the remainder following almost immediately. After rising and circling they started for their homes.

BALLOONS.

There were five captive balloons. One known as the "signal balloon" designated the emperor's headquarters and was also used by the maneuver direction. The commander of the Red and of the Blue forces each had at his disposal one balloon. There were two others used for experimental purposes.

The "signal balloon" was the most important. It had a large red flag with two white and two black fields in the center to distinguish it. All officers and men seemed to be familiar with its five signals. For several years these signals have taken the place of the old trumpet signals, which often took hours to reach all the troops participating in the maneuvers, so that frequently in one wing the firing continued, while in the other the troops had gone into quarters or bivouacked. At that time there were only two, sometimes three, divisions in question, now when eight or more divisions are in maneuver the balloon is indispensable. Of all the technical devices it is the most apparent, as it is visible from everywhere. Its signals are immediately transmitted. For instance, if a large ball appears attached to the balloon every one knows that "all halt" is ordered; if behind the ball there hangs a long inflated bag the order is "all halt and commander's call;" two bags, "all halt and adjutant's call;" a bag and three small baskets, "all march;" two balls, "march home for stations." No other balloon signals were used. The "signal balloon" was worked by a detachment of balloonists having 1 windlass wagon, 1 material wagon, and 2 gas vehicles, each carrying twelve receptacles of hydrogen compressed to 150 atmospheres.

Each of the commander's balloons was in charge of a detachment composed as follows: Two officers, 60 men, 1 windlass wagon, 2 wagons for material, 6 vehicles for gas, and 1 or 2 baggage wagons. They were provided with telephones by means of which the observer communicated to the earth. He could also send written communications in a small leather bag provided with a ring to slip along the cable wire. The cable is 1,100 yards long, and the balloon can rise to a height of 950 yards.

The most important observation made was perhaps with regard to the mounting and transportation of the machine gun, its extra parts, ammunition, and cans of water; the organization of the "machine-gun abtheilung" and its mode of service in battle. While many other countries have Maxims, Germany probably is unequaled in the manner of mounting and serving them.

The field of maneuvers was equally favorable for the tactical use of all arms. The country was of varied character, with fair proportions of level ground, hills, open fields, forests, lakes, brooks, and rivers. There were no fences. The peculiar clayey character of the soil and the extensive cultivation of the sugar beet rendered the fields heavy and sticky after the rains. Of special importance to the introduction of the maneuvers was the Weichsel River, over which pontoon bridges were laid by the Red army. The width and depth of the stream are extremely variable. Its velocity was about 1 to 1.5 yards per second.

Nearly all the firing of the infantry was from the prone position. There was no volley firing. In places the hills favored surprises, and allowed the battalions to be held close in hand and to be put into action in close order.

In the open ground lines of skirmishers advanced first and were reenforced by similar lines from the rear. The firing line thus seemed to be renewed by ever-approaching lines of skirmishers drawn from the reserves, and was apparently never exhausted. Although this method of reenforcing the firing line is objectionable, in that it tends to delay the advance until the arrival of reenforcements, there seems to have been no preferable method introduced during the maneuvers for the attack over open ground.

The ideas and plans for the maneuvers were prepared by the chief of the general staff, General of Cavalry Count von Schlieffen, and the necessary details were worked out under his supervision. He was present during the whole of the maneuver period and supervised the work at the headquarters of the maneuver direction. At critical periods he could generally be seen near the emperor to receive and execute his orders.

JAPANESE MANEUVERS OF 1901.

[REPORTED BY MAJ. O. E. WOOD, ARTILLERY CORPS, UNITED STATES MILITARY ATTACHÉ AT TOKYO.]

The maneuvers took place in the Miyagi province, about 250 miles north of Tokyo, between November 6 and 10, 1901.

The foreign military attachés and other officers who had been invited to witness the maneuvers left Tokyo on November 5, arriving at Sendai, the capital of the province, on the evening of the same day, where every arrangement possible had been made for their comfort.

The foreign spectators were as follows: The military attachés of Great Britain, France, Germany, Russia, and the United States of America. In addition there were 3 English, 3 French, 3 Russian, 1 Italian, 3 Corean, and 30 Chinese officers, among whom were Major General Ivanoff of the Russian army and General Pak of Corea, minister of foreign affairs, who attended the maneuvers as military guests.

On November 7 the emperor arrived at Sendai, and was received at the railroad station by the princes, high officers of the Japanese army, and the foreign officers.

On the 8th and 9th the emperor witnessed the maneuvers, and on the 10th a grand review was held by his majesty on a large field in the vicinity of Séminé.

This was followed by a reception and banquet on the same evening at Sendai in the emperor's presence, at which 2,000 persons were present, including the princes, marshals, members of the cabinet, officers of the army, both Japanese and foreign, and high officials and civilians.

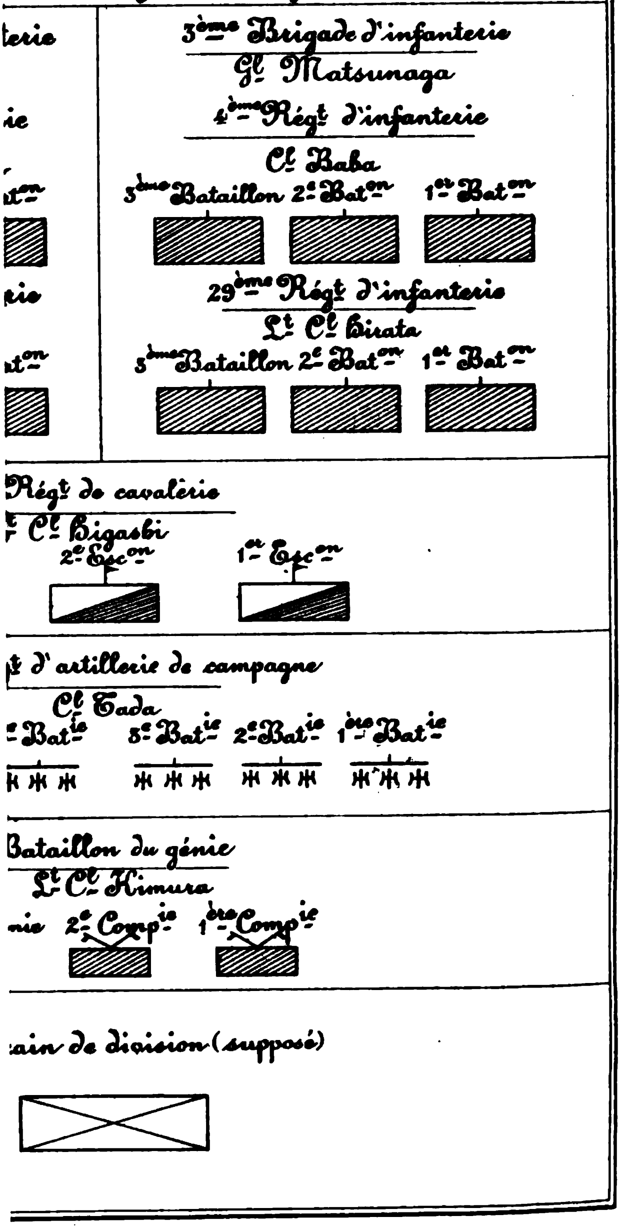
GENERAL PLAN OF MANEUVERS.

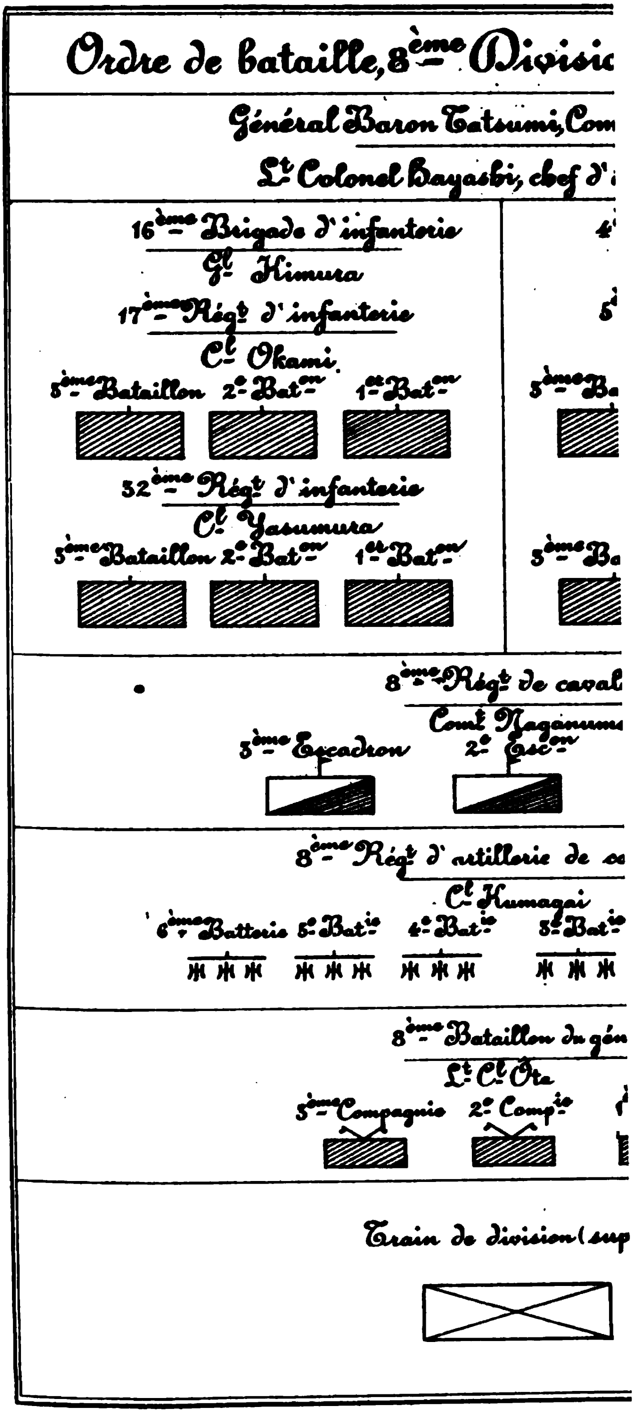
1. The Northern army (eighth division) has disembarked in Aomori Bay in the extreme north, at the port of Noheji,

ème Division, Armée du Sud.

on Nishi, commandant la division

anida, chef d'état-major.





Ordre de bataille, 8ème Divisi

Général Baron Tatsumi, Com

Lt Colonel Hayashi, chef d'

16ème Brigade d'infanterie

Gl Kimura

17ème Régt d'infanterie

Cl Okami.

3ème Bataillon 2e Baton 1er Baton

32ème Régt d'infanterie

Cl Yasumura

3ème Bataillon 2e Baton 1er Baton

4

5

3ème Ba

3ème Ba

8ème Régt de caval

Comt Naganum

3ème Escadron 2e Escon

8ème Régt d'artillerie de ca

Cl Kumagai

6ème Batterie 5e Batie 4e Batie 3e Batie

8ème Bataillon du gén

Lt Cl Ota

3ème Compagnie 2e Compie

Train de division (sup

in Mutsee province. The town of Noheji is on the northern railway from Tokyo to Aomori.

2. The Southern army (second division) will march against them.

GENERAL INSTRUCTIONS FOR NORTHERN ARMY.

The eighth division having disembarked at Noheji, will follow the Riku-ou road in a southern direction with the intention of occupying Sendai, arriving at Ichinosseki on the night of November 5, the cavalry reaching the line of the Sannohazama River. After reaching Ichinosseki, the division will learn that the enemy, composed of different arms, arrived in the village and environs of Tsukinoki on the night of November 4.

ORDERS.

1. Advance posts for the night of November 5 are assumed.
2. Patrols and cavalry must not pass line of the Sannohazama River, the former before 7.10 a. m., and the latter before 7.40 a. m. of November 6.
3. The other troops must not go beyond the southern extremity of Ichinosseki before 8 a. m.

GENERAL INSTRUCTIONS FOR SOUTHERN ARMY.

The second division is charged with repulsing the enemy, who has followed the Riku-ou road in a southern direction. They will advance northward by the same route and arrive at Sendai on November 5.

The cavalry will be advanced as far as Yoshioka.

Information was received that the enemy, in the strength of nearly a division, was in cantonment at Mizusawa and vicinity on the night of November 4.

ORDERS.

1. Advance posts for the night of November 5 are assumed.
2. Patrols and cavalry must not pass the line of the branch of the Yoshida-Sawa, the former before 6.30 a. m. and the latter before 7 a. m. on November 6.
3. The other troops must not pass beyond the northern extremity of Sendai before 9 a. m.

RÉSUMÉ OF ORDERS GIVEN NOVEMBER 5.

EIGHTH DIVISION (NORTHERN).

HEADQUARTERS, ICHINOSSEKI, *November 5, 4 p. m.*

1. The division will advance to-morrow toward Tsukidate by the Riku-ou road.

2. The independent cavalry will push toward Yoshioka and cross the line of the Sannohazama River at 7.40 a. m. and reconnoiter in the direction of Koushida and Nakashinden.

3. The head of the infantry of the advance guard will start at 8 a. m. from the western extremity of Ichinosseki.

4. The main body will assemble by 8.30 a. m.

SECOND DIVISION (SOUTHERN).

HEADQUARTERS, SENDAI, *November 5, 4 p. m.*

1. The enemy, whose force is estimated in the neighborhood of a division, was established in cantonment on the night of November 4 in the vicinity of Mizusama.

2. The division will march to-morrow toward Yoshioka.

3. The independent cavalry will leave to-morrow morning from Yoshioka, will push forward toward Ichinosseki, and will watch and scout the roads toward Iwadeyama, Masaka, Ichinosseki, and Séminé, Wakayanagi and Ichinosseki.

4. The advance guard will move at 9 a. m. past the point where the road turns off to Tsutsumimachi, and advance on the Riku-ou road.

5. The main body will follow.

NOTES ON THE OPERATIONS OF NOVEMBER 6.

On November 6 the cavalry of the respective forces came into contact, but no opportunity of witnessing the operations was accorded to the foreign spectators.

The following account was taken from *The Japan Times* of November 7, 1901:

"At 10.20 a. m. of Wednesday the two reconnoitering parties of cavalry encountered each other at the river Ono, flowing in the vicinity of Takashimizu. The Southern party being numerically stronger, the Northern party was driven back, but about an hour later the main body of the Northern party arrived, and a sharp skirmish took place. The Southern party finally remained the master of Takashimizu."

RÉSUMÉ OF ORDERS FOR NOVEMBER 7.

EIGHTH DIVISION (NORTHERN).

1. The division will advance toward Furukawa with the object of attacking the enemy.

2. The independent cavalry will set out from Aza-Kanizawa at 5.30 a. m. and will scout in the direction of Furukawa, Kogoda, and Nakashinden.

3. The head of the infantry advance guard will leave Matsunagani at 7.15 a. m.

4. The right flank guard (one battalion of infantry) will advance toward Furukawa by way of Takumori, Minamissawa, and Sanjiurihara.

5. The main body will assemble on the road with the head of the column east of the bridge over the Akaguma River.

REMARKS.—The position of the Northern army on the night of November 6 was as follows: The independent cavalry at Aza-Kanizawa about 2¼ miles north of Takashimizu; the main body in and about Tsukidate; the advance guard in the vicinity of Akanuma with outposts along the line of Aza-Kamiteru, Koshi, Matsunaga, and Nenbutsendan; detachments posted at Aza-Sotohagi and Aza-Horiguchi.

SECOND DIVISION (SOUTHERN).

1. The division will march to-morrow against the enemy by the Riku-ou road.

2. The advance guard will leave Aza-Zafu at 6 a. m. reenforced by a battery of field artillery and a detachment of the sanitary corps.

3. The main body will assemble at 6 a. m. in the environs of the Yoshioka and Shibazaki, and follow the advance guard.

REMARKS.—The position of the Southern army on the night of November 6 was as follows: The cavalry in the village of Takashimizu; main body in cantonment in and about Yoshioka; the advance guard near Aza-Hirabayashi and Shionama; small detachments of the advance guard at Sambonagi-mura as support to the cavalry.

NOTES ON THE OPERATIONS OF NOVEMBER 7.

All the foreign spectators were conducted on the morning of November 7 to the spot marked (I) (Map of "Tsukidate"). As the head of the eighth division reached Baba, the troops deployed and bringing forward their left flank as indicated on the map, made an advance against the village of Araya. Before the attack could develop, a squadron of cavalry was sent down the road to Araya, but was ordered back by the umpires. At 11 a. m. the troops on the left of the eighth division were seen to be falling back from Araya, but at this point it became necessary for the spectators to return to Sendai in order to receive the emperor on his arrival. The eighth division subsequently fell back on Tsukidate. The following account is taken from *The Japan Times* of November 8: "Both armies came in contact at Shimidzunohara yesterday morning at 9 a. m., and after a skirmish between the cavalry of the advance guards of both parties, the Northern artillery took up a position on an elevation at Ono-mura, while that of the Southern army occupied the farm to the north of Araya. At 11 a. m. the defending army opened fire upon the invaders. In a few hours the latter advanced steadily and a hot fight ensued. The battle closed at 2 p. m."

COMMENTS ON OPERATIONS AROUND ARAYA ON NOVEMBER 7.

The Northern artillery (mountain guns, 7.5 centimeters) did not arrive in time to support the advance guard attack on Araya. The Southern artillery (field guns, quick-firing, 7.5 centimeters) opened fire on the Baba heights at a distance of some 2,500 yards. The guns were well concealed, and on this occasion were kept well out of effective infantry fire. Their fire would probably have been most effective on the half battalion of Northern infantry, which attempted a flank march against the right flank of the Southern army.

The cavalry's advance on Araya in close sections was a weak move, and the infantry should have kept to the west of the road where the ground was good and extension possible. The companies on the east got huddled together on the paths. The cavalry trotted in sections down the Riku-ou road supported by some companies of infantry extended east and west. The movement, in my opinion, was highly dangerous, for one machine gun in Araya or a few well-posted infantry could have annihilated the whole cavalry force before its arrival at Araya, distant about 1,100 yards from the high ground from which the cavalry advanced. Moreover the ground to the west of the road appeared possible for cavalry, as evinced by the pace at which the infantry went across it.

INSTRUCTIONS GIVEN TO THE EIGHTH DIVISION, NOVEMBER 7, AT 2 P. M.

1. It seems likely the enemy will leave Sendai in a few days with about 3,000 troops, with a view to marching north.

2. The following additional troops are placed under your orders:

Two battalions of the twenty-fifth infantry and the second battalion of the seventh artillery. (NOTE.—Supposed to be two batteries of mountain artillery.)

3. The troops will reach Tsukidate by 11 a. m. November 8.

4. Endeavor to avoid being brought into decisive action before their arrival.

SITUATION OF THE SECOND DIVISION (SOUTHERN) ON THE NIGHT OF NOVEMBER 7.

Two battalions of infantry were at Aza-Nozawa; the old advance guard at Taagehara; the remaining troops on the heights east of Aza-Kitakomatsu; division headquarters at Kakuman Temple; the outposts extending along the stream to the north of Daimachi on the line Daimachi, Aza-Nozawa; the independent cavalry in neighborhood of the Sêminé road north of Yotsudan, reconnoitering the enemy's position.

RÉSUMÉ OF ORDERS FOR NOVEMBER 8.

EIGHTH DIVISION (NORTHERN).

[Issued on evening of November 7.]

1. The eighth division occupies the heights southeast of Tsukidate, and on arrival of reenforcements will advance toward Takashimizu on the Riku-ou road.

2. The independent cavalry will pass through Matsunagani at 7.30 a. m. and reconnoiter toward Furukawa, Tadziri, Sêminé.

3. The troops will be distributed as follows: The field artillery east of the old road; the sixteenth brigade at Aza-Tati on the road Tsukidate–Sêminé; the fourth brigade in reserve at Tsukidate. The engineers will construct intrenchments.

4. When the division marches forward, the advance guard will consist of one regiment of infantry and one battalion of field artillery. The left flank guard will be one battalion of infantry. The remaining troops will follow.

5. The situation of the eighth division is about the same as on the night of November 6.

SECOND DIVISION (SOUTHERN).

1. The enemy has retired to the north of the Yoshinogawa.

2. The second division will pursue the enemy to-morrow.

3. The independent cavalry will cross the line of Tomikana at 7.30 a. m. and reconnoiter from the direction of Sêminé.

4. The right-flank guard will cross the bridge over the Tomikana south of Chojobara at 8 a. m. and march by Sêminé and Tanuazana on Tsukidate.

5. The advance guard at 8 a. m. will cross the bridge of the Yoshinogawa south of Takashimizu and march on Tsukidate by the Riku-ou road.

6. The main body will assemble at 8 a. m. southeast of Daimachi.

NOTES ON THE OPERATIONS OF NOVEMBER 8.

The foreign spectators were conducted to the spot marked (2) on the map of "Tsukidate," arriving there at about 10 a. m. The eighth division (Northern) had already intrenched on the line indicated on the map in red. No attempt was made to delay the Southern forces by occupying the successive ranges of hills. Artillery fire opened at 10.30 a. m. At 11 a. m. the division advanced. The advance was made shoulder to shoulder, and what was worse, the supports on the crests of the hills where we were standing were huddled in four ranks, two standing and two kneeling, and firing over the heads of their own advancing troops. The arrival of (imaginary) reenforcements, and not the force of the Southern attack, induced the umpires to order the retirement of the second division. The following is taken from *The Japan Times* of November 9:

"Yesterday morning the Northern army posted its artillery line at the southern edge of the Tsukidate plateau, thus making the approach of the Southern army very difficult. But the Northern army, having lost the preceding battle, did not hope more than to hold fast in the plateau, so that its main force did not move from the center of the stronghold before the battle began. The Southern army began the march at 8 a. m. Its vanguards soon met with a body of the scouts of the enemy, defeated them, pursued them to a place called Matsunokane of Tamasawa-mura, very nearly to Tatesuki, where they filed along a slope and began to fire on the lines held by the Northern army at 10.40 a. m. Meanwhile the main body of the Southern army arrived on the scene and steadily marched toward the left wing of the Northern army in the face of a heavy fire from the artillery line of the enemy. Then a hot fight ensued for more than an hour. The Southern army lost ground, when the main forces of the Northern army fell on its left wing. At 12.20 p. m. the latter beat a retreat and an armistice was proclaimed."

COMMENTS ON OPERATIONS AROUND TSUKIDATE NOVEMBER 8.

The Southern army commanded the Northern position all day, and in my opinion the Northern position was untenable. Seeing, however, that the Northern army was adjudged to have held its position, the Southern attack at midday across the open was pure folly.

The cavalry (Southern) took no part in the general fighting. The whole regiment was seen early in the day working eastward. Little use seemed to be made of patrols, and the general impression was that the Southern general did not know how to use them.

The Northern artillery opened fire at 10.45 a. m. against the Southern infantry posted on the heights to the east of the Riku-ou road and southeast of Tsukidate. The guns were commanded by medium-range infantry fire, and seemed to have been advanced too far. They could not have remained under such fire as would have been concentrated on them, and in my opinion were badly handled.

The Southern artillery opened fire at 11 a. m. against the Northern infantry lying in serried ranks in the open at a distance of about 1,200 yards. The guns were well masked and were on favorable ground. Their fire must have been effective, and although they were within rifle range of the enemy, they could not have found a more suitable place.

RÉSUMÉ OF ORDERS FOR NOVEMBER 9.

EIGHTH DIVISION (NORTHERN).

The eighth division, with a view to attacking the enemy, will advance to-morrow on the Riku-ou road.

The independent cavalry will pass the line of outposts at 8.30 a. m. The advance guard will pass the line at 9 a. m. The main body will assemble at 8.45 a. m. at the intersection of the Nakazato and Shinden roads.

The advance guard will consist of one regiment of infantry, one battalion of artillery, and one squadron of cavalry. The line of outposts will be near and to the north of Takashimizu.

SECOND DIVISION (SOUTHERN).

The second-division will occupy to-morrow the line Haranaka (right flank) Kakumanji, Tori, Uhara (left flank), distributed as follows: One company twenty-ninth infantry at

Haranaka; fourth infantry at Kakumanji; thirtieth infantry and second battalion of field artillery at Daimachi, Tori, Uhara.

The regiment of cavalry will reconnoiter in the direction of Séminé.

The rest of the troops will be held in reserve south of Kayakari.

OBSERVATIONS.

The following was the situation of the second division on the night of November 8. The headquarters of the fifteenth infantry brigade, the thirtieth infantry, one battalion of field artillery, and the larger part of the engineer corps were bivouacked in the environs of Daimachi.

The regiment of cavalry with infantry supports were bivouacked in the environs of Nakawara. The main body was bivouacked on the heights south of Kakumanji.

The line of outposts was bivouacked along the line of the Yoshinogawa River.

NOTES ON THE OPERATIONS OF NOVEMBER 9.

The foreign spectators were conducted to the spot marked (3) on the map of "Tsukidate," on the left of the southern position. The attack was made as usual, in close order. The artillery of the attack was well placed on the heights commanding the line of intrenchments and partially masked. The Southern artillery lost the advantage of their superior range (being armed with field guns, while the Northern were armed with mountain guns). One battery of the Southern artillery came into action where we were standing. By noon the reserves had arrived, and the whole line pushed forward for a counter attack. Suddenly a heavy fire from the enemy was opened on the left, and the flank attack took this battery in reverse at a range of less than 100 yards. The second division was taken completely by surprise.

At this moment three guns of the battery referred to were firing due east and the other three due west, and all the troops within reach crowded to the left flank. The firing line of the eighth division (of the attack), which at this time was within 200 or 300 yards of the position, and therefore within easy supporting distance of its flank attack, had its supports and reserves close up. It had only to advance practically unopposed. The whole situation was simply impossible. "Cease firing" was sounded and the operations brought to a close. The verdict given by the umpires was "a drawn battle."

The following is taken from *The Japan Times* of November 10:

"Yesterday morning the Southern army arrayed its soldiers in a line between Tohriagehara and Kakumanji, constructed an intrenchment on its left, and thus waited for the attack of the enemy. The Northern army brought a regiment of infantry to the front of the battle line of the Southern army and threw its left wing on the lateral side of the enemy. Then the latter put the reserves in motion and was just going to make an assault on the left wing of the Northern army at 12.45 p. m. when an armistice was declared. The emperor saw the maneuvers from Kakumanji, and after the armistice was proclaimed his majesty was pleased to give a comment on the maneuvers to the chief officers of both armies. His majesty the emperor issued the following rescript by way of comment on the sham campaign:

"'I have ordered the chief of the army staff to pass judgment on the conduct of the maneuvers. I must, however, say that from my personal inspection on the present occasion, after the long interval of time that has elapsed since I last saw similar movements by the troops of the northeastern district, I notice a marked improvement attained by them in military operations. Now that the affairs of the world demand the utmost efficiency of the imperial army, I enjoin you, officers and men, to exert yourselves to the best of your ability, to the end that you may efficiently discharge by your joint efforts the grave task of acting as pillars of my empire.'"

COMMENTS ON OPERATIONS SOUTH OF TAKASHIMIZU, NOVEMBER 9.

No cavalry appeared on the scene at all during the whole day. Patrols were apparently not used, as, had they been on the Riku-ou road, the Southern general would have had early information of the Northern flank march against his left, which was a complete surprise.

THE GRAND REVIEW.

On November 10 a grand review of all the troops took place in a large fairly level field, a short distance to the north of the previous day's operations.

After his majesty had inspected the troops, they were merged (the two divisions) into one body for parade purposes; all the infantry, then the artillery, and finally the cavalry passing in succession.

The troops consisted of eight regiments of infantry (company front), two battalions of engineers (company front), six batteries of field artillery (battery front), six batteries mountain artillery (battery front).

The guns were drawn by a single horse in shafts, the four other horses being led in column behind each gun; two regiments of cavalry (squadron front). The alignments and distances in column were good.

After passing the emperor, the troops of the two divisions marched off in different directions without any crowding, stoppage, or delay, and when his majesty left the field the troops were out of the way and the roads clear.

GENERAL IMPRESSIONS.

INFANTRY.

The infantry's marching powers appeared to be extremely good, and their stamina, as evinced by the pace of their attack and retirement, on the 8th, is exceptional.

The pack carried seems heavy, and appears to drag on the men's shoulders. It looks as if nearly 50 per cent of the infantry carry intrenching tools.

The fire control is good, and the noncommissioned officers appear to be efficient.

The infantry is armed with the Murata magazine rifle, caliber 0.286. Each soldier carries three pouches of ammunition of 40 rounds each—total, 120 rounds—one pouch on each side of the belt, and one at the back on the belt below the knapsack, which is very hard to get at. In fact, I saw one soldier on the firing line assisting another to get at the cartridges in the pouch at the back.

Reserve ammunition was distributed along the firing line by men detailed for that purpose.

ARTILLERY.

The field and mountain guns are of the same caliber, about 7.5 centimeters. The gun is the invention of General Arisaka of the Japanese army and is spoken of as "the Arisaka gun."

The fieldpiece is drawn by six horses, and the caissons usually accompany a battery, although none were seen during the maneuvers. The gun sits very much lower between the wheels than our field gun, the horizontal axis appearing to be in the plane of or a little below that of the wheel axle. This at first appears to be a decided advantage, as it is impossible to overturn the gun, but it seems to give the pole a downward inclination which might be dangerous over a rough country. The fieldpieces are called "quick firing" and are said to be capable of firing ten aimed shots per minute, but on the 9th instant when they used the rapid fire the largest number was thirty-four rounds by a battery of six guns in one minute, or a little over five rounds per gun.

The extreme range is said to be 8,000 yards for shell and 6,000 yards for shrapnel, but it can not be verified now. The charge of powder and weight of shrapnel are not known, but the weight of the shell was stated to be 6 kilos (unverified).

The horses are small and light. The harness appears light, and the traces are attached to a spiral spring to ease the strain in starting. Antirecoil is effected by a small skid placed under and to the rear of each wheel and attached over the axle to a piston on the trail, which brings the gun back to its former position.

No opportunity was given to see the mountain guns at close range except as they passed us on the road or while passing in review. It was ascertained later that 40 rounds of ammunition are carried in the chest on the gun limber and 90 rounds in the two chests of the caisson, making a total of 130 rounds for each field gun. Both time and percussion fuzes are used.

CAVALRY.

The cavalry is armed with the Murata carbine, caliber 0.286, and carries the carbine slung behind and over the shoulder. They also wear the saber, the noncommissioned officers alone carrying revolvers in addition. Each cavalryman carries one pouch containing thirty rounds of ammunition. The cavalry is undoubtedly the weak spot of the army. The horses, whose average height is well under 14 hands, are apparently strong and well suited for mounted infantry work. The equipment seems to aim at lightness rather than strength. The use of small patrols seems to be lacking, and I never saw the cavalry except in close formation, and never dismounted.

NOTES ON THE ORGANIZATION OF THE JAPANESE ARMY, AND GENERAL COMMENTS ON DISCIPLINE, UNIFORM, EQUIPMENT, ETC.

The army of Japan is organized into twelve divisions and the imperial guard, which constitutes an additional division.

The headquarters of the divisions are as follows: Division of the imperial guard at Tokyo, first division at Tokyo, second division at Sendai, third division at Nagoya, fourth division at Osaka, fifth division at Hiroshima, sixth division at Kumamoto, seventh division at Sapporo, eighth division at Hirosaki, ninth division at Kanazawa, tenth division at Fukuchiyama, eleventh division at Marugami, twelfth division at Kokura.

Three brigades, say 7,500 men, are detached for service in Formosa.

The seventh to twelfth divisions are not yet completely organized.

Each brigade is composed of two brigades of infantry, one regiment of cavalry, one regiment of field artillery, one battalion of engineers, and the division trains.

A brigade of infantry is composed of two regiments, a regiment of three battalions, a battalion of four companies. The regiments of cavalry which participated in the maneuvers were composed of but three squadrons each.

The regiment of field artillery of the second division was composed of six batteries (of six guns each) of field guns, divided into two battalions of three batteries each. The regiment of field artillery of the eighth division was composed of six batteries of mountain guns.

The Japanese army is raised by conscription. The soldier serves three years with the colors, four years in the first reserve, during which time vacancies in the colors are filled from the first reserve, and finally five years in the second reserve. All males between 20 and 40 are liable to be called out in case of national emergency.

The soldiers are young sturdy-looking fellows, and the route step is similar to ours; the soldier carries his rifle at will, even looks around, but preserves an absolute silence. The parade step, as it is called, which was taken at the grand review, is a painful thing to see, and partakes of the grotesque; the foot is raised high with the toe pointing downward and is brought to the ground with a sickening thud, which must be felt all through the spinal column, at the same time the left arm is swung violently to the front, bending the elbow, the motion being a greatly exaggerated component of our double time, while the step is like the "double step" practiced by our recruits. And yet they keep excellent time and also good alignments. An English officer present remarked, "Just like the German parade step."

The discipline of the Japanese soldier leaves absolutely nothing more to be desired; they are perfect soldiers in this respect. With regard to their tactics, no opportunity was given to see them go through the manual of arms, or any company or battalion movements, but the different bodies of troops moved to their designated positions on the field at the appointed time without apparent confusion. The officers appeared well instructed.

The two divisions, of about 9,000 men each, were marching continuously for five days and half of the nights in order to be at the proper points the next morning, yet there was no straggling, so far as could be observed. They either bivouacked at night or were billeted in an adjacent village.

The maneuvers were well planned and arranged. Topographical maps of the theater of operations were supplied each foreign officer in advance, by which the movements could be followed. Every night at our quarters in Sendai, the written orders and instructions for the two opposing forces for the following day, as well as a résumé of the day's operations, in French, were given each officer.

The operations of the first day were simply an affair of outposts and advance guards.

In the general engagement on the second day, which ended in the retreat of the defending force, the position taken by the defending army was excellent, and likewise that of the enemy, each on high ground with a valley of rice fields between them at a distance of nearly 2,000 yards. However, when the defenders left cover and charged down the hills and across the rice fields in the open to take the opposite heights, the merciless fire of the army in position would have annihilated the entire force had there been any bullets in the rifles, but nevertheless they retreated (under orders) in good order.

On the third day the attacking force was well handled, their artillery well placed, and the flank attack admirably carried out, to the complete surprise of the defending force, which was in an intrenched position.

All branches of the service use smokeless powder, which made it extremely difficult to locate the positions of the firing batteries under partial cover of trees or other obstacles. The same held good with regard to infantry fire, if under cover; the position can hardly be located, even with glasses. As is well known from the experience of our army in Cuba, an invading force of troops in a strange country is at a great disadvantage when smokeless powder is used by the enemy.

During the maneuvers, in order to distinguish one army from the other, the eighth division, or Northern army, wore white cloth covers over the caps, while the second division, or Southern army, wore the regular blue cap with the wide yellow braid.

It was noted that each company has four buglers, and when the regiment marches on parade or review they are united into a body of 48 buglers, led by a chief bugler, marching at the head of the regiment. There are no regimental bands. The imperial band is an independent body, and at the review wheeled out of column opposite the emperor and played continuously while the troops were passing.

CLOTHING AND EQUIPMENTS.

All officers and soldiers wear a cap similar in shape to ours, of dark blue with a wide yellow braid where ours is black, and a yellow cord a short distance above the braid. The only exception is with the officers and soldiers of the imperial guard, who have a red braid and cord.

All general officers wear gold braid, all others cloth. The blouse is of dark blue, similar to ours. The strap on the shoulder and trimmings are red for infantry, yellow for artillery, dark purplish-red for engineers, and the cavalry wear a dark-blue yellow-braided tunic; the supply corps have light-blue trimmings, and the sanitary corps green. The trousers are dark blue, with red stripes for infantry, yellow stripes for artillery, and red trousers with green stripes for cavalry. The engineers have a purplish stripe and the supply corps a light-blue stripe on their dark-blue trousers.

The noncommissioned officers wear narrow yellow braids on the cuff, and parallel to it, to indicate rank. Commissioned officers wear rows of black braid on the sleeves of their blouses, like those of our overcoats, to indicate their rank.

The overcoat is dark blue, like the rest of the uniform, but as I only saw it rolled on top of the knapsack, I do not know if it has any distinguishing mark.

The infantry wear a shoe similar in appearance to ours, and also canvas leggings. They also carry a pair of straw sandals to wear when directed.

The cavalry and artillery wear boots with a short wide leg. The overcoat is rolled on top of the knapsack, which is small and contains one change of underclothes and socks; an extra pair of shoes is carried, one on each side of the knapsack. The ration can be strapped to middle of back of knapsack, and contains one meal of rice and meat. They also carry a cloth bag at one side for extra rations or sundries, a small flat bottle-shaped canteen, a bayonet in scabbard, and three pouches of ammunition. I saw no blankets.

Several men fully armed and equipped were noticed leading bicycles, and were evidently used as orderlies.

HORSES.

The horses used by the artillery and cavalry are small, thick set, and sturdy, never over 14 hands, and will not average as much. They look rough and uncouth, but are well trained to the different gaits and seemed to be afraid of nothing. It was noticed at the grand review, that in the march past of the artillery and cavalry at a trot, there was not a break in the gait (the cavalry in squadron front, and the batteries of six guns in line). The alignment was very good.

The army is very deficient in cavalry, very few regiments having been organized. This is due to a lack of horses. An edict has been recently issued prohibiting the exportation from Japan of any horses. A large stud farm is located in the north, others are being started, and they are endeavoring to improve the number and breed of horses by the importation of stallions from abroad.

A rough estimate of the number of troops, by counting the men of the companies, squadrons, and batteries as the opportunity offered, gives the total number of the two divisions about 18,000 men; a company of infantry 143 men, or 1,800 to a regiment; a company of engineers 179 men, or 548 to a battalion; a squadron of cavalry 156 men, or 503 to a regiment; a battery of field artillery 138 men, or 883 to a regiment; a battery of mountain artillery 123 men, or 793 to a regiment.

MANEUVERS IN NORWAY IN 1901.

[Reported by Lieut. Col. W. R. Livermore, Corps of Engineers, United States Military Attaché at Copenhagen and Stockholm.]

The field maneuvers this year took place a little north and east of Trondhjem. They were intended to represent the defense of this city and its railroad communications with Sweden and Christiania against an attack from an enemy who had landed on the western coast. They were conducted in accordance with the following order:

Army Order No. 1, 1901.

The field maneuvers this year, in accordance with the King's order of April 11, will be held during the period from August 30 to September 5, inclusive, in the region between Vaerdalsören and Aasen church.

The maneuvers will be conducted with two parties operating against each other, a North party and a South party, constituted as given below, under the command of the general in chief unless otherwise ordered.

* * * * * * *

Hs. L'Orange.
Hans Rustad.

Christiania, *July 13, 1901.*

The troops taking part in the maneuvers were divided into two parties:

THE NORTH PARTY.

First regiment:
- The school battalion (two cadet companies, Trondhjem's brigades, and Tromso Stift noncommissioned officers' school).
- Indherreds line battalion.
- Nordmore line battalion.
- Trondhjem brigades band.

Second regiment:
  Trondhjem line battalion.
  Sondmore line battalion.
  Helgeland half battalion: Vefsen and Ranen Kreds companies.
  Nordenfjeldske cyclist company of the line.
  Trondhjem cavalry corps of the line corps.
One battalion staff, three batteries and a park division, of third field artillery corps line battalion.
Two platoons of second line sapper company.
Half a sanitary company, formed of the Nordenfjeldske sanitary corps.
One field hospital (ambulance).
One commissary column, composed of the Nordenfjeldske train company of the line.
One intendantur detachment.
Chief: Major General Overgaard.

THE SOUTH PARTY.

Indherreds landwehr battalion.
Trondhjem landwehr battalion.
Nordmore landwehr battalion.
Sondmore landwehr battalion.
Bergen brigade band.
Sondenfjeldske cyclist company of the line.
The school squadron.
One mitrailleuse detachment, formed from Trondhjem cavalry corps.
One battalion staff, two batteries, and one park detachment, formed of third field artillery corps landwehr battalion.
One platoon of second line sapper company.
Half a sanitary company, formed of Nordenfjeldske sanitary company.
One field hospital (ambulance).
One commissary column, formed of Nordenfjeldske train company of the line.
One intendantur detachment.
Chief: Major General Klingenberg.

Half a telegraph company is placed directly under the headquarters.

The line orderly squadron is divided between the staffs.

About 20 officers of high rank were assigned as umpires.

The strength of each organization is shown in the following table:

	Combatants.			Noncombatants.					
	Officers.	Underofficers.	Corporals, band, and privates.	Officers.	Underofficers.	Corporals, band, and privates.	Guns.	Carriages.	Horses.
THE NORTH PARTY.									
The staff of the party	5	1	13	2	2	15		6	30
The regiment's staff	2		4			1		1	8
The Nordmore line battalion	15	34	461	2	2	28		12	24
The Indherred line battalion	13	38	509	2	3	28		12	23
The school battalion	13	22	463	1	3	19		12	26
The regiment's staff	2		3			1		1	7
The Helgeland line battalion	9	22	355	1	2	17		8	16
The Sondmore line battalion	13	41	409	2	5	22		12	24
The Trondhjem line battalion	11	35	665	2	3	29		12	24
Nordenfjeldske cyclist company	2	5	83	1	1	5		3	5
Trondhjem line cavalry corps	8	22	207	4		16		9	258
Third field artillery battalion of the line	10	46	276	5	2	48	18	35	375
Second line sapper platoon	2	8	96	1		13		6	13
Half a sanitary company				4	5	65		5	14
One field hospital				3	6	19		9	20
Intendantur detachment				3	3	46		19	43
Train detachment				2	4	97		50	128
Total	105	274	3,544	35	41	469	18	212	1,038
THE SOUTH PARTY.									
The staff of the party	5	2	11	4	3	6		5	29
Indherred landwehr battalion	12	28	421	2	3	36		12	23
Trondhjem landwehr battalion	11	28	442	2	3	25		12	23
Nordmore landwehr battalion	11	28	424	2	3	24		12	23
Sondmore landwehr battalion	12	26	325	2	3	28		12	23
Bergen brigade band	1		18			1		1	2
Sondenfjeldske cyclist company	4	7	84	1		4		3	5
The school squadron	3	6	63	2		1		2	76
One mitrailleuse detachment	1	4	16					1	34
Third field artillery battalion of landwehr	7	35	202	4	8	37	12	25	261
One sapper platoon	1	2	48			3		2	6
Half a sanitary company				2	9	43		5	13
One field hospital				3		18		9	20
Intendantur detachment				3	3	31		14	28
Train detachment				2	26	76		46	120
Total	68	166	2,054	29	61	333	12	161	686
Headquarters, with telegraph detachment	23	16	93		1	38		26	114
Umpires' quarters	27	1	23						39
Grand total	223	457	5,714	64	103	840	30	399	1,877

Combatants	6,394
Noncombatants	1,007
Total personnel	7,401

Each detachment will bring the following ammunition:

For the infantry and cyclists—

120 blank cartridges for each private and corporal.

30 blank cartridges for each noncommissioned officer armed with a carbine.

18,000 cartridges in ammunition cart.

For the cavalry—
    50 blank cartridges to each carbine.
For the artillery—
    250 shots for each gun,
For the engineers and train detachments—
    30 blank cartridges to each man.

No ammunition is required for the orderly squadron and the hospital detachment.

About 600 men were transported by rail, viz, the telegraph detachment, cadets, and sappers. The school squadron is said to have marched from Christiania to the battlefield at the rate of 60 kilometers a day.

My report on the maneuvers in Norway in 1899 gave an extensive account of the leading features of the directions for umpires during field maneuvers, published July 17, 1899, and also a description of the very interesting and complete method of marking the wounded during the maneuvers and simulating such medical treatment as would be required in real warfare.

The following orders were published in the field at the opening of the maneuvers:

GENERAL SUPPOSITION.

In connection with a main attack on the north of Sweden, a secondary attack took place in the region about Trondhjem.

A large force disembarked in Lyngenfjord, south of Namsos;* a detachment of the fleet tried to pass the fortifications at Agdenen,† but without success. It can be supposed that the Norwegian warships, detached to defend and guard the Trondhjemfjord, are at the same time charged with the defense of the entrance at Agdenen.

* * * * * * *

SPECIAL SUPPOSITION.

The South party.

The combined Trondhjem brigade of landwehr, the South party (see order of battle), received orders to cover Trondhjem, and also as much as possible the connection with Sweden. It advanced in a northerly direction toward the Vardal and reached Levanger late on the evening of August 29. Its main force went into bivouac north of this place, with outposts at Leveraas, Hogskot, Mule, and Ostborg.

In the course of the evening different reports arrived: (*a*) That the detachments of landstorm ordered to scout the roads to the north had been thrown back and scattered along the main road, and also on the road along the Lekdalsvand; (*b*) that the bridge at Vaerdalsören was partly destroyed by a small detachment of landstorm passing it on the retreat; (*c*) that hostile cavalry patrols had been observed at different places along the Vardalselv between Ören and Östnes bridge.

---

* One hundred and twenty-five kilometers north of Trondhjem.

† North of Trondhjem 40 kilometers.

The North party.

The force disembarked at Lyngenfjord, the North party (see order of battle) received orders to try to take possession of the Meraker railroad,* and eventually Trondhjem by a quick advance.

The disembarking force, which placed two battalions of the third regiment (imaginary) to cover its base and line of operations, advanced from Stenkjar with its main force along the road east of the Lekdalsvand. A flank detachment (one battalion) followed the main road to Vaerdalsören. After having thrown back and scattered several small detachments of landstorm, the disembarking force on the afternoon of August 29 went into bivouac at the south end of the Lekdalsvand with the outpost on the line Minsaas-Holmsveet-Holmen. Connection was made with the battalion advancing along the main road. This battalion bivouacked with its main force at the Leklem farm, with outposts in the direction of the Ysse and Nordberg farms. The advance-guard cavalry, which bivouacked for the night with its main force at the Volen farm, sent in a report that the bridge at Vaerdalsören had been found partly destroyed, and that it would not be passable for several hours, but that the bridge at Östnes was not damaged and that the cavalry had taken possession of it at once.

During the advance the roads from Sweden through the Vardal were supposed to have been observed by the remainder of the third regiment (1 battalion) and two companies of the second regiment, all imaginary.

ORDERS TO THE NORTH PARTY.

(Supposed to have been sent out from Nedre Vist, August 29, at 6.10 p. m.)

1. The Indherred and Nordmore battalions will guard, respectively, the region Trones-Naestvold and the region Naestvold-Eklo.

2. The cavalry corps during the night will guard the Vardalselv from Eklo to and including the bridge at Östnes and the south side of the Vardalselv to Guding.

3. The roads from Vuku toward the east will be patrolled constantly. (Imaginary; will not take place.)

4. At 4 a. m. strong officers' patrols will be sent out (the patrols will really not be sent out before 10 a. m.), (*a*) via Vinne, Höilo, Raulo, Okkenhaug Chapel toward Levanger; (*b*) via Vinne, Rein, Balhald, Salthammer, Mule; with instructions to try to find out the position and strength of the enemy. The cyclist company will patrol the main road from Vaerdalsören toward Levanger.

Reports will be sent from the officers' patrol directly to the corps chiefs and to me. I will be at Vaerdalsören from 10 a. m.

A. OVERGAARD.
W. MORGENSTIERNE.

To the TRONDHJEM CAVALRY LINE CORPS.

---

* Running east from Trondhjem.

(Supposed to have been sent out from Nedre Vist, August 29, at 7 p. m.)

1. I intend to continue the advance to-morrow toward the south.

2. The detachments will therefore be in marching order to-morrow at their bivouacs as follows: (*a*) The battalions of first regiment and the cavalry corps at 10 a. m.; (*b*) the remaining detachments, except the cyclist company, at 11 a. m.

3. The cyclist company will be in marching order at 9.45 a. m. to-morrow at the crossroads east of Vaerdalsören to the north of the main road, where it will await further orders.

4. I will be at Vaerdalsören from 9.45 a. m.

A. OVERGAARD.
W. MORGENSTIERNE.

TO BE SENT TO: FIRST REGIMENT, CYCLIST COMPANY, SECOND REGIMENT, CAVALRY CORPS, FIELD ARTILLERY BATTALION, SANITARY COMPANY, FIELD AMBULANCE, CHIEF OF ENGINEERS, CHIEF OF TRAIN, CHIEF OF INTENDANTUR.

ORDER TO THE SOUTH PARTY.

HEADQUARTERS, ROSTAD, *August 29, 11 p. m.*

1. It has not yet been reported that the enemy has passed the Vardalselv.

2. The brigade will for the present stop its advance until further information has arrived about the enemy.

3. The outposts placed for the night will remain until further orders.

4. The remainder of the detachments of the brigade will be in marching order at their bivouacs at 10 a. m. to-morrow.

5. The baggage train will retire to Slettin at Mo (east of the main road) where it will stand in marching order at 10 a. m.

6. The chief of artillery, the chief of the cyclists, the squadron chief, and the chief of the engineer platoon will report as soon as possible to the brigade headquarters for further instructions.

T. O. KLINGENBERG.
DAVID VOGT.

TO BE SENT TO: THE OUTPOST BATTALION (FIRST BATTALION), SECOND BATTALION, THIRD BATTALION, CYCLIST COMPANY, SCHOOL SQUADRON, MITRAILLEUSE DETACHMENT, ARTILLERY BATTALION, SAPPER PLATOON, SANITARY COMPANY, TRAIN.

As the complete official reports of the operations have not yet been received, the following sketch will serve to give a general idea of the operations from day to day. It has been prepared partly from personal observation and partly from information received from various sources during and after the maneuvers, including the accounts published in the Christiania newspapers, so far as they appear to be consistent with reliable information derived from other sources.

OPERATIONS OF AUGUST 30.

At 7.45 a. m. the outposts of the South party were ordered to advance to Mule, Östborg, and Östnes bridge. The North party sent out its patrols across the ford at Volen. At 8.45 a troop of cavalry of the North party advanced via Stiklestad to the bridge over the Vardalselv at Östnes, took possession of the bridge, and sent out patrols to the westward as far as Guding, south of the Vardalselv.

At 10 a. m. hostilities began. Soon after 10 o'clock the remainder of the cavalry of the North party crossed the Vardalselv, partly by wading and partly by swimming the horses, advanced as far as Vinne church and sent out officers' patrols toward Mule and Okkenhaug. When the repairs on the bridge at Vaerdalsören, which was supposed to have been blown up by the landstorm retreating, had progressed far enough, the cyclists were allowed to cross and carry their wheels with them. They sent out a patrol toward Rindleret. By 12 o'clock the engineer troops were supposed to have repaired the bridge and the infantry immediately began to cross.

The South party sent three companies of the Indherred battalion to Salthammer and one to Leveraas. The Trondhjem battalion went to Hojemshaug with one company in advance. The Nordmore battalion remained at Heir; the Sondmore at Gjeite. The school squadron reconnoitered in the direction of Okkenhaug. The cyclists with the field mitrailleuses remained at Mule. One battery of artillery took position at Östborg and one at Gjelset(?). Levanger bridge was prepared for explosion.

The patrols met at 12.30 and exchanged shots. The school battalion of the North party went to Myren. The Nordmor battalion crossed the river. The cyclists soon brought the information that the heights Mule–Salthammer were occupied and that the South party's cavalry was at Okkenhaug chapel patrolling the roads to the north and east. This cavalry surprised and captured one of the officers' patrols of the North party.

At 2.30 p. m. the first regiment commenced the attack, the school and Nordmore battalions in the first line and the Indherred battalion in reserve. The Nordmore battalion was directed via Blybakken and Rindsen against Nedre Salthammer, and the school battalion via Halland and Rindaune against Övre Salthammer. The cyclists kept in touch with the enemy as far as practicable; but in the pass at Mule they were driven back with great loss by mitrailleuses. Although the advance in both directions was partially covered by trees and buildings, both of the advance battalions of the North party were sufficiently exposed in their advance over the open ground to have suffered severe losses, which would materially have checked their advance and at least have compelled them to take advantage of the shelter afforded by the woods. The reserve battalion followed via Graven and Nedre Rinden under fire of the artillery of the North party at Östborg and then marched by the left flank to a place of shelter to escape from the fire, the companies being more or less separated. At about 4.15 p. m. the South party began to withdraw gradually from Salthammer, as the position was about to be turned on its right flank by the school battalion. The reserve battalion of the North party crossed over to the left flank. At 5 p. m. the school squadron on the right flank of the South party was driven back from Okkenhaug by the cavalry of the North party. When the reserve battalion had advanced to Rindaune and the musketry fire was hottest, the signal to cease firing was sounded.

The following orders were published on the evening of the 30th.

HEADQUARTERS, NO. 15.

SALTHAMMER, *August 30, 5 p m.*

To the North party.

The party has succeeded in taking possession of the defile at Mule during the day's fight and in advancing on the Bygdevej to Okkenhaug chapel. The party decided to discontinue the pursuit for the night. It went into bivouac with outposts at Storborg, Rokne, Högskot, and Segtnan.

HS. L'ORANGE.
HAKON HANSEN.

HEADQUARTERS. NO. 16.

SALTHAMMER, *August 30, 5 p. m.*

To the South party.

After the party succeeded in forcing the enemy to deploy his forces, by the defense of the defile at Mule by the outposts, the party retreated to the position prepared at Levanger with outposts at the bridge at Munkerostad Övre, Gran, and Sogstadgaardene.

HS. L'ORANGE.
HAKON HANSEN.

OPERATIONS OF AUGUST 31.

A little before 7 a. m. the South party took up a defensive position at Stob, Gjeite, Tingstad. The hill at Gjeite had been fortified the day before. The artillery was east of the farm in a very strong position facing the defile at Mule. One battalion of infantry was at Gjeite, one battalion was at Övre Gran but afterwards went back to Tingstad, where a shelter trench had been prepared, and two battalions were in reserve between Gjeite and Tingstad. The cyclists and the mitrailleuses were at the bridge at Levanger and the cavalry was sent forward via Munkeby toward Okkenhaug. The North party advanced at 8 o'clock against the fortified position of the South party in two columns. Two and a half battalions were directed against Gjeite and three against Tingstad. The Trondhjem line battalion and Helgeland half battalion followed the highway toward Levanger. The school battalion on the left marched via Gjelset and Övre Gran and the cavalry corps on the extreme left from Klövjan to Okkenhaug chapel and Segtnan, and reconnoitered toward Munkeby. After a little skirmish on the picket line, the fight began with the artillery fire being directed from Gjeite, against the advance guard of the North party advancing via Mule toward Rostad. At 9 o'clock the North party's artillery came into position at Rokne and was immediately fired upon by the artillery of the South party.

The cyclists were forced back across Levangerelv and took up a position there. Afterwards they retired toward Alstadhaug. When the infantry of the North party had reached Sogstad one battery of artillery at Gjeite fired upon it. At 11 o'clock the infantry of the North party had reached Rostad and Leren with its right flank and Hegle with its left. Either voluntarily or by command of the umpires both batteries of the South party withdrew to a position sheltered from the hostile artillery and directed their fire against the infantry of the North party which was advancing toward Gran and Hegle.

The artillery of the North party marched to Övre Rostad. At the last moment, when the school battalion, reenforced by the Indherred battalion, had worked up to the right flank of the Tingstad position, three companies of the reserve were sent up as reenforcements to the battalion of the South party at Tingstad. These, however, did not reach it, for when it became evident that the right wing was surrounded the position at Tingstad was abandoned and the artillery at Gjeite received orders to retire to Eggen. It had just reached the river at 12.20 p. m., when the signal cease firing was sounded.

The result of the day's fight was that the South party succeeded in holding the position Stob–Gjeite, but the right wing was forced to yield. The South party was therefore compelled to retire.

OPERATIONS OF SEPTEMBER 2.

The South party took up a position at Eggen and Rinden with outposts at Alstadhaug and Gilstad; the Indherred landwehr battalion on the left flank at Nöjsomhed; two companies of the Nordmore landwehr battalion at Mellem Eggen; the Sondmore landwehr battalion on the right wing at Rinden; one company at Höislo and one at Aune; the mitrailleuse detachment at Höislo. The Trondhjem landwehr battalion and the rest of the Nordmore were in reserve behind the right wing. The artillery was at Store and Eggen. The cavalry was sent forward toward Alstadhaug church. All these positions were entrenched.

During the night the North party bivouacked at Rostad with outposts at Stob, Halsan, Langaas. Levanger bridge was repaired by the engineers during the night. The cavalry was sent over the bridge toward Alstadhaug, where it met the cavalry of the South party, which was forced to retire; while that of the North party pushed on as far as the main road near Eggen. The main body of the North party, consisting of the school battalion, the second regiment, the cyclists, artillery, sappers, etc., was ordered to advance along the main road from Levanger. The Nordmore battalion, with two guns acting as advance guard, was ordered to halt at Nossum. A left flank detachment, consisting of the Indherred battalion, was ordered to march via Matberg, Sve, Restadaune, Höislo against Brennmaal and Rinden. When the main body arrived at Levanger it was ordered to cross over to Alstadhaug church and attack Store, while the Nordmore battalion made a demonstration against the front in the direction of Gilstad–Eggen.

Early in the forenoon the artillery of the South party opened fire against the advancing enemy. The two guns of the North party, which were attached to the Nordmore line battalion, were sent up to the crest of the hill at Nossum, where they began firing. The artillery of the enemy directed a violent fire against them which put them out of action after a few shots. The crossing of the bridge was hidden by the engineers, by suspending canvas two meters in height over the parapet of the bridge. Three hundred tents were used for this purpose. The school battalion crossed first, then the Helgeland half battalion, the Trondhjem, and Sondmore battalions. The artillery went by different roads to two positions near Frederikkefryd, where they succeeded in unlimbering before the enemy had fired many shots at them. An artillery duel at long range followed. At 11.50 the school battalion reached Alstadhaug church, after a march through trees and bushes without being fired upon, where they found the cavalry and cyclists. They took up a position in the churchyard and one company in the field in front fired rapidly against the enemy at 1,000 meters. The artillery at Store, however, directed its fire against them and the umpires declared them out of action. In the meantime the artillery fire continued and the North party formed for the attack on the edge of the forest behind Alstadhaug.* When the South party learned that the attack was coming from the peninsula, the reserve at Rinden was sent at double-quick time to receive it. At 12.30 the Sondmore battalion left the position at Rinden, and as the right flank of the South party was turned a retreat was ordered along the whole line.

The firing was kept up during the retreat. An attempt on the part of the cavalry of the North party to disperse the retiring enemy was unsuccessful and the cavalry was put out of action by the umpires in consequence of its losses from infantry fire.

The artillery of the South party took up a new position at Skjerve to protect the retreat of the infantry. The artillery of the North party at Store and Eggen aided in the pursuit, but a little before 3 p. m. the signal to cease firing was sounded.

The South party bivouacked at Skjerve with outposts at Hove Elv. The North party bivouacked in the region of Store-Eggen, with outposts at Leren, Hove, Liene.

---

*It is said that the engineers of the North party made some Quaker guns at Alstadhaug, and simulated artillery fire with gun-cotton cartridges.

OPERATIONS OF SEPTEMBER 3.

The South party, expecting reenforcements of two battalions and one battery during the course of the day, fell back to the Nesvand to effect a junction with them. At 6 o'clock it left Skjerve and in the course of the day took up the following positions: One battalion at Kolsum, north of the Nesvand; one at Nes; with one company in advance at Neshaugen and south of Rangul; three companies at Viken on the west side of Hoklingen; one company with the cyclists and two mitrailleuses at Strom to watch the bridge between Hoklingen and Movand. The artillery was on both sides of the Nesvand, one battery at Nonstad, and one behind Ringstad protected by the remaining battalion. The cavalry kept up the communication with the three companies at Viken by the road from that point to Hammer, and explored the forest along the road to Rangul and the front of the left flank. The train and field hospital were located at Hammer.

About 8 o'clock the North party sent forward cavalry patrols from the right flank. At 11 o'clock an officers' patrol reached Rangul. It was stopped by the infantry at Neshaugen.

At 12 o'clock the advance guard reached Rangul. The advance-guard battery went into position at Skjele and fired on the infantry of the South party. Soon after, the infantry at Neshaugen withdrew and the southern artillery commenced firing. The main body of the North party advanced by the main road with one company on the old road to Nes and the cyclists on the left flank toward the bridge between Hoklingen and Movand.

At 1 o'clock the Helgeland and Trondhjem battalions of the North party reached the northern end of the Nesvand and fired on the southern artillery behind Ringstad and the infantry at Kolsum. The northern infantry to the west of the Nesvand was put out of action by the cross fire of the southern infantry and artillery. A little after 1 o'clock the signal to cease firing was sounded.

At 2.15 p. m. hostilities were resumed. The main body of the northern infantry had now reached Rangul. One battalion was sent forward to the west of the Nesvand against the battery at Nonstad and seven companies to the east of the lake, three of which advanced against the infantry in front of Ringstad and four against the heights to the east of it, to turn the position and silence the artillery. One of the batteries of the main body came into action alongside of the advance-guard battery which had advanced to about 1 kilometer south of Skjele. Six battalions and one battery of the North party were left behind at Skjerve to secure the line of retreat. The battalion sent against the artillery at Nonstad did not arrive in time to commence firing until 4.15 p. m., when the recall was sounded. The infantry advancing against Ringstad was met by two and one-half battalions and brought to a stand. The cyclists sent against the Hoklingen met with superior forces and could accomplish nothing.

As the result of the day's fighting it was decided that the South party had repelled the attack. The North party retreated and the South party, reenforced by one battery and two battalions, advanced its outposts to the line Gryte, Elsaetersveen, Neshaugen and went into bivouac around the Nesvand. The outposts of the North party extended from Ekne to Rangul, Gotaas, Kjesbu.

OPERATIONS OF SEPTEMBER 4.

In consequence of the losses sustained in the attack on the positions around the Nesvand the North party fell back. Its cavalry was deployed to Daling toward the coast. The school battalion furnished the outposts Daling–Gotaas and the Helgeland half battalion from Gotaas to Lello. The Nordmore and Indherred battalions took up a position at Sanberg and the Trondhjem line battalion from Eggen to Röslien, where the sanitary company was also stationed.

The position of the South party during the night was as follows: One company of the Sondmore battalion and the cyclists at Strom; two companies of the Sondmore battalion on the road west of the Hoklingen with outposts at Gryten and Elsaeter. The outposts of the Trondhjem battalion were at Nes. The Indherred battalion bivouacked at Ringstad; the Nordmore at Hiberg; the cavalry at Skjelstad; the artillery and sappers at Nonstad; the sanitary company at Hammer; the field hospital at Marienborg and the train at Aasen church.

At 9 o'clock the South party advanced in battle formation: The main body of four battalions and three batteries from Rangul to Skjerve with the cavalry on the left wing via Holte; the right column of two battalions from the western shore of the Hoklingen against the left wing of the North party; the right flank detachment of cyclists and mitrailleuses from

Strom; east of Hoklingen, against the enemy's left wing. The North party's outposts fell back before the line of skirmishers of the South party, which covered the entire front and advanced slowly through the woods. Those of the left wing retreated firing, via Rinden and Leren, pursued by the South party's cavalry. Holte and Gotaas were evacuated about 10 o'clock, and about noon the South party's skirmishers appeared on the edge of the woods south of Skjerve. The position taken up by the North party was as follows: The Nordmore line battalion at Sandberg; the Indherred battalion at Oster Eggen; the Sondmore at Rinden; with the Trondhjem, the school battalion, the cyclists, and the Helgeland half battalions as reserves; the cavalry on the right wing. All the artillery (three batteries) was massed at Store on a line stretching across the road toward Eggen. The position was strongly fortified under the direction of the engineers.

The South party did not attack during the night, but bivouacked with the Trondhjem battalion in the center near Skjerve; the Sondmore on the right and the Nordmore on the left; the artillery at Gotaas. A lively reconnoissance was kept up by both sides during the night.

The advance of the South party was conducted with great skill in taking advantage of ground and enabling the troops to advance without unnecessary exposure to hostile fire.

At 2.30 p. m. the signal to cease firing was sounded, but soon after hostilities were resumed and the "state of war" continued during the night.

OPERATIONS OF SEPTEMBER 5.

At 5 o'clock the South party's artillery opened fire against the North party's artillery at Store; its infantry and cyclists advanced along the whole line. The attack was made by the Nordmore landwehr battalion against the position at Sandberg and the railroad station at Skogen, from the hill between this position and Holberg. It was supported by one and a half battalions of the reserve and by the fire of the artillery at Skjerve. The Trondhjem landwehr battalion was also directed from Hove against Sandberg. The school squadron was placed on the right flank in order to make a demonstration against Stavlo, in connection with the Sondmore landwehr battalion. At 6.30 the Nordmore battalion opened fire from the wood on the hill and the Trondhjem landwehr battalion reached Re. The hill at Sandberg was supposed to have been fortified by carefully constructed shelter trenches. It was held by the Nordmore line battalion. When the attack developed the school battalion from the reserve came into line on the left of Sandberg. It appears, however, that it was for a time withdrawn from this position, and as all the fire of the South party was directed against the Nordmore line battalion, its losses were quite serious and a considerable part of its forces was put out of action by the umpires. They were, however, eventually replaced by the reserves, who came up just as the infantry of the South party got to within 100 or 200 meters of the trenches at 9.05 a. m., when the maneuvers were stopped.

At 8 o'clock a counter attack was ordered against the right wing of the South party. The Sondmore line battalion, reenforced by the Trondhjem battalion, and the Helgeland half battalion advanced from Rinden via Röslien, attacked the Sondmore landwehr battalion and put it out of action. To guard against this attack the Trondhjem landwehr battalion was diverted from its advance against Sandberg, but it had not reached the right flank when the maneuvers ceased. As the result of the fight the umpires decided that the hill at Sandberg had been taken, but that the right wing of the South party had been turned.

COMMENTS, RULES, ETC.

From the above account of the course of the maneuvers it will appear that many very interesting situations were developed; and in view of the fact that a thorough and detailed account is to be published by the Norwegian Government, this will furnish an excellent basis for the study of applied tactics by the Norwegian officers during the coming season, not only by showing what took place under given circumstances, but by a consideration and discussion of what other course was possible in each case. For example, it is interesting to consider what would have happened on the first day if the South party had taken up a more advanced position, placing at least one battery of artillery upon the hill at Salthammer, where it would have had a wide field of fire over the open ground in front. This artillery, properly supported by the other arms, would have materially delayed the advance of the North party and perhaps enabled the South party to take advantage of any mistakes its adversary might have made in forcing or turning the position. On the other hand, the South party was enabled, under the cover of its first line, to strongly intrench the position at Levanger and Tingstad, where the second day's fight occurred. This position was impregnable from the front against any forces which the North party could bring against it. It is interesting to consider what would have happened if the South party had kept a stronger reserve on its right flank to take advantage of the North party in its attempt to surround this flank.

On the 2d of September the dispositions of the South party were excellent. Its position was impregnable from the front if properly defended. Its extreme right flank was well protected by the mitrailleuses, etc., and a considerable reserve behind the right flank was ready to support any point that might be attacked. It is interesting to consider what would have happened if, when it became evident that the attack was divided into three columns, with the main body separated from the other two by the water of the Eidsbotten, if the reserve, instead of shifting to the left flank, had prepared an ambuscade for the center column advancing from Nossum toward Rinden, and then a similar one for the detachment advancing via Höislo. Had these ambuscades succeeded, the reserves, reenforced by the right flank, would have had an excellent opportunity to fall upon the enemy's right flank, which might, in the meantime, have been lured forward to the neighborhood of Eggen and then exposed to a cross fire or perhaps cut off altogether.

On September 3 the position taken up by the South party was very strong. The roads via the Nesvand could not be forced from the front and it would have been extremely dangerous to divide the attack along the three roads connecting Levanger with Aasen. It is interesting, however, to consider what would have happened if the North party had sent a much larger force against the hill to the east of Ringstad, making only a faint attack on other parts of the position and leaving only enough troops there to keep up communications and hold its line of retreat. After the South party had received its reenforcements it advanced systematically and cautiously to the north and reconnoitered the woods rather carefully. The North party retired cautiously and took up a very strong position. The advanced post, however, at Sandberg presented a salient point, very much exposed to the cross fire that could be directed against it from the south and west. The hill on the west offered great advantage to the attack, in that several tiers of fire could be directed against Sandberg from positions so far apart that neither line would suffer much from fire directed against the others. On the other hand the hill at Sandberg was strongly entrenched and it would have been almost impossible to take it by assault, if the infantry in the trenches withheld its fire until the last moment. The fire of the artillery of the South party on this position was very effective, although it was itself subject to the fire from the artillery of the North party at Store. It would have prevented reenforcements coming to the trenches from any distant point, but there was good shelter for the reserves immediately behind the trenches. Just before the signal "cease firing," two companies of infantry belonging to the North party are said to have been well posted on the right flank of the position at Sandberg, where they could have enfiladed with their fire the whole line of the infantry of the South party, which had taken up its position behind the railroad embankment at the foot of the hill. If these two companies could in reality have occupied the position, the attack on the hill at Sandberg would have been unsuccessful. The situation is one of great interest, in view of the fact that the scale might have been turned by a very slight error on either side. Had the South party been successful at Sandberg, it is extremely improbable that it could have carried the position at Store.

With regard to the general employment of the several arms of the service, the infantry in general appeared to have a good idea of the advantage of different kinds of ground affording shelter and a good command over the ground to be swept with its fire, but in some cases it failed to appreciate the necessity of taking open formations when under the close fire of the enemy. The artillery generally took good positions for defending a portion of the field, but did not play that active rôle in the fight which the artillery of the future will be compelled to play, and which even the old artillery could safely assume without danger to itself, when it could contribute materially to the support of the other arms. The mitrailleuses did very good work, for, in connection with the cyclists, they were able to hold positions detached from the main body and to advance or retreat, when necessary, much more rapidly than the infantry which would otherwise be required for the same service. The cavalry was so weak in numbers that it did not accomplish much upon the battlefield. The South party was particularly unfortunate in its lack of cavalry, for if 20 or 30 men could have been spared to accompany the mitrailleuses, a force would have been created, which could have been transferred at a gallop from one point of the field to another, with a capacity of fire equal to two or three companies of infantry and might in several instances have materially affected the result of a fight. The cyclists did good work in reconnoitering the roads, but the country was so obstructed that they could not work to good advantage. The engineers did excellent work and showed great ingenuity. The outpost service was in general very well conducted, but as in some other European armies it was withdrawn or only imperfectly maintained on the battlefield. On several occasions ambuscades could have been prepared, so that troops advancing over the open ground would suddenly have found themselves exposed to a cross fire at short range, from which it would have been impossible to escape. The troops holding defensive positions often opened fire at long range and thereby revealed their position, whereas if they had remained concealed, the enemy would have approached to such close range that the fire of the defense would have dispersed or annihilated him. The supply departments did themselves great credit. The traveling kitchen has already been described. It did good service at the maneuvers, baking bread on the march, etc. The medical department in Norway differs from that in some European countries in the fact that the doctors have military rank. They take great pride in their work. In their method of marking and treating the imaginary wounded, they conduct a medical drill in connection with the autumn maneuvers. The rules are quoted below.

Unlike the armies of many of the great European powers, the Norwegian soldiers are generally only maintained in the service for a comparatively short time, which for the infantry is only about one month in the year. Such armies are more interesting to Americans because the conditions are more nearly like those of our own volunteers. Both officers and men take a serious and active interest in their duties. The Norwegian soldiers are as well instructed in the elementary branches of military work as could be expected in their term of service. In their independent way of thinking and acting they are more like American soldiers than those of some European countries, and upon the whole as good material for an army as could be desired.

For his equipment the Norwegian soldier makes use of a bag or knapsack. Each man carries a triangular piece of canvas which forms a fourth of a tent. Intrenching tools, viz, the Linneman spade, axe, and pick, are distributed as usual in European armies. The chief peculiarity of the equipment of the Norwegian soldier is his sleeping bag, which is made of oiled canvas, and supposed to be water-tight. It is as long as the man, and he ties himself up, leaving only a small hole as big as a silver dollar on the top of his head to admit the air for breathing. Instead of an overcoat, he wears an "Iceland Tröje," like a thick undershirt; his head is also covered with the same material, leaving only an opening for the eyes, nose, and mouth. He does not carry an extra pair of walking shoes, but large soft leather slippers which he puts on at night and which, if his feet are sore, he is allowed to walk in short distances during the daytime.

In my report on the Norwegian maneuvers two years ago I called attention to some of their leading features, which it may be of interest to repeat in this connection. The object of these maneuvers is to instruct the officers and men in all branches of their field duty without any unnecessary attempt at parade or display. I expressed the opinion then that the autumn maneuvers should be reserved for the solution of questions which could not be determined by calculation, study, exercises upon the map, practice at the target range, or upon the drill ground. When such organized work is not practicable the maneuvers are still of interest and value in affording a starting point for subsequent study and discussion, as well as for practicing all branches of the service, especially the supply departments, in the duties that will be required of them in operations on a large scale. I also said that in the Norwegian maneuvers the umpires were selected from officers who, from their experience and ability, were eminently qualified to make the decisions that were required of them, and their numbers were proportionately as great as usual. The maneuvers, however, would afford a more perfect representation of actual warfare if more umpires were available, as well as a more perfect system of calculating the losses from fire and estimating the effect of those influences upon which the decisions are based. The duties of the umpires are more arduous and more important than those of the troop leaders, and there is no reason why their number should be less, provided the necessary officers are available from other organizations. The umpires should also be provided with so perfect a system of signaling by flag, telephone, courier, etc., as to be able to control the movements of both parties and direct them in the course which they would probably take in actual warfare without requiring any material delay to make and enforce their decisions. It is doubtful, however, if maneuvers have ever been conducted on so large a scale in this manner.

From what I have learned since this suggestion was made, I am satisfied that the number of umpires in all the autumn maneuvers in Europe is altogether too small, and that in this respect the Norwegians do not compare unfavorably with other nations. If the number of officers available is limited, it would be better to divide the number by 3, assigning to one-third the duties of umpires, and leaving the other two-thirds to command the troops, and to assemble no more troops for the maneuvers than those officers could properly command. I understand that it is proposed at the next maneuvers in Norway to materially increase the number of umpires. In my report two years ago I called attention to some of the leading features of the rules defining the duties of the umpires. As most of these rules are still in force they are quoted here.

The course of instruction for the Norwegian army for the next winter season involves a much more extensive programme of kriegsspiel and similar exercises on the map than heretofore.

THE DUTIES OF THE UMPIRES.

The duty of the umpires during an engagement between opposing parties is to make such decisions as are needed to give the fight a result as nearly as possible in accordance with what would have happened in real warfare. The commander in chief of the field maneuvers also acts as supreme umpire and the chief of umpires is second in command. The number of the umpires and adjutants detailed for duty under the chief umpire is regulated by the numbers, the combination of the detachments taking part in the maneuvers according to the circumstances. The umpires are generally distributed by flanks or by subdivisions. Sometimes special umpires are detailed for duty with single detachments, such as advance guards, side detachments, etc., also on picket lines or for night operations. The decisions of the umpires must also be made when a decisive turn would have taken place in reality as result of fighting. If a number of umpires are present, the decision of the senior umpire shall in case of disagreement be conclusive. The umpire decides that the detachment in question must stop its advance, or it must retire (in the latter case in which direction), or that it shall for a time be placed hors de combat. Before a detachment can be judged to be hors de combat its loss must have amounted to one-third of its strength, or it must be in such a condition that it can not be expected to continue the fight before the expiration of some time, or else the case in point must be such that the detachment in case of real war would be obliged to surrender. It is an aggravating circumstance if the losses have occurred in a very short time. If an attack is made at the point of the bayonet, the umpires decide which of the parties is victorious, and fix for this party a certain time which may be considered necessary for assembling the troops before they can be used in pursuit. During a long fight the umpires can, from time to time, give decisions about the losses incurred by the firing. The computation of losses is made from the inclosed tabular forms.

NOTE.—As an indication to the umpires, and also that the detachments themselves may know whether they are shot at by artillery, each battery in action will mark the object of its fire by placing on that flank from which the wind blows two signals at a proper distance on a line in the direction of the object. White signals are used when the object is artillery, red when it is infantry, and green when it is cavalry. The poles of the signals are of different heights, so that the signals seen from the object do not cover each other.

Each detachment carries a loss flag to mark when and where the losses are becoming so great, and the power of the detachment so weakened that the superiority of the adversary begins to make itself felt. The flag is raised and lowered again under the direction of the umpire. The flag will serve only as an indication to the leaders of the effect of fire on each side, and will not be considered as binding with reference to their conduct. Their conduct must be founded upon a supervision of the tactical situation as a whole, and must be so judged by the umpires.

NOTE.—Every infantry company and battery carries a loss flag. The flag is a square with a side of 0.5 of a meter for infantry and 1 for artillery. One diagonal half is red, the other white. The height of the pole for infantry, 1.5 meters; for artillery, 2.5 meters. The flag is so placed that it can be distinctly seen; with artillery it is placed immediately at the side of the signal, which is used to mark the object fired upon. Decisions about losses, as well as about the result of minor engagements, must only be made by the umpire himself and not by his adjutant.

In making decisions about the result of the engagements of the several arms, the rules about to be given are to be regarded rather as standpoints from which the umpire can form his decision, without being binding upon him, since in the maneuvers many circumstances which can not be brought under a fixed rule will tend to modify the result. In the decisions special attention must be paid to the moral factors, so far as they make themselves apparent in peace, and especial weight must be given to the order and discipline of the troops, as well as to the manner in which they are led by their officers.

Against a well-conducted deliberate infantry fire it is impossible for infantry detachments in close formation and without cover, at distances of 800 to 1,000 meters, to stop or to move sideways unless the fire from their own firing line is about equal to the enemies' fire. Across a zone swept by the enemies' fire, inside of 800 meters closed, uncovered detachments, even protected by a strong firing line of their own, can move only forward or backward. The decision of the umpire is needed to determine whether they can stop longer inside such a zone. At distances inside 400 meters, under infantry fire, the decision of the umpire must be made quickly.

Before deciding whether a bayonet attack has succeeded or not, the preparatory infantry or artillery fire must first of all be taken into consideration, thereafter the relative strength, the numbers of fresh troops engaged on each side, the way in which the attack was made, the position of the defenders, and the nature of the ground. It is also important to note whether the attacking party has succeeded in striking one of the adversaries' weak points or surrounding one of his flanks. If a collision takes place under these circumstances between detachments of any considerable strength, the decision of the umpire must always involve important consequences for one side or the other, even if the fortune of the day is not decided by the success or failure of the attack. In front of infantry in order, whether closed or extended, cavalry can only show itself inside 1,000 meters to make an attack. The decision of the umpire is needed for any other kind of movement or for a halt without cover. Artillery can not unlimber, except under special circumstances, when fired at by infantry inside 1,000 meters. In general it can only unlimber under actual cover at this distance. Artillery can, however, advance within this distance when it cooperates with the advancing infantry for the final attack. The losses received in this connection must, however, be taken into account when the decision is givèn. Artillery under the fire of infantry at shorter distances loses quickly its power to move, and can not limber up at all inside of 400 meters, unless after short move by hand the limbering up can take place under cover. A greater effect must be assigned to infantry fire from the flank. In an artillery fight the infantry can at 1,500 meters support its own artillery with advantage, especially by making the service of the hostile guns unsafe. If the infantry can fire at the artillery in the flank, it can at this distance inflict considerable loss. At 1,200 meters the infantry can even inflict serious loss on artillery by frontal fire.

In estimating an attack of infantry against artillery it is important to note whether the infantry has succeeded unperceived in obtaining a covered position at effectual firing distance from the artillery, and also whether the force is directed against the troops of other arms, which cover the artillery. Also, if the attack takes place at the right moment, before the artillery can limber up to retreat, and if this succeeds in time to direct a new fire against the horses. In the latter case the umpire decides whether the retreat of the artillery must stop, and whether an attack can be made on the artillery column thus stopped. After it has been decided that the infantry can attack the batteries it will have to be decided whether it has captured the guns or carriages or made them unserviceable, in which case the artillery must be placed partly or altogether "hors de combat."

On account of the short duration of a cavalry fight the judgment of the circumstances which come into consideration in such a fight is difficult. In a cavalry attack it is therefore specially important for the umpires to be on the spot at the right moment. In deciding the result of a fight it is necessary to consider the proportional strength and position of the adversaries and the way in which the attack is made. In an attack against cavalry it is not, as a rule, as important to make a long and rapid charge as it is to produce powerful and concentrated shock. The result of the attack is increased if an outflanking movement is successful. If cavalry is attacked while in the act of deploying, a small attacking force can be considered victorious. On the other hand, even a considerable superiority in numbers will not make itself felt if the leader does not understand how to employ his forces at the right moment.

NOTE.—Attack against cavalry must stop at a suitable distance. The troops that by the umpire are judged to be defeated retire in a state of disorganization. The victorious troops can either close ranks or pursue with a part or with the whole strength. A distance of 100 meters is to be kept during the pursuit. If the pursued party does not recommence the fight, it must retire without organizing so long as the other party pursues with sufficient force. The umpire takes care that the pursuit stops at a reasonable distance. The defeated party must retire, even if not pursued. in open ground about 300 meters before it can reorganize.

In deciding an attack against infantry its condition must be taken into special consideration. It is to the advantage of cavalry if infantry undertakes to change its formation or if it does not preserve the necessary composure in delivering its fire.

If the infantry is not surprised or has not already been shaken, the attack may be regarded as unsuccessful, if it is not made in a formation of sufficient depth and is not carried out with the whole strength and with full shock. In the latter case a cavalry attack will always involve great loss to the cavalry. Artillery in movement may be regarded as defenseless against a cavalry attack, if it is not protected by other troops. Artillery in position is vulnerable against a cavalry attack on the flank. A cavalry attack against the front of artillery may be attended with great loss, but it is not impossible that it may succeed if it is conducted in a proper manner and with a formation of sufficient depth. After it has been decided how far the cavalry can advance against artillery it will have to be decided whether the cavalry will succeed in capturing guns or carriages or if in any other way it can secure to itself the advantage of the fight. A cavalry fight on foot is regarded as analogous with an infantry fight so far as the effect of fire is concerned, but on a smaller scale.

In judging the effect of artillery fire the following circumstances must be taken into consideration: If the artillery has succeeded in coming under cover into position so as to open fire suddenly; if the firing point has been chosen with proper regard to the effect of its own fire and so as to make it difficult for the adversary to get the range; the number of the batteries firing against the same object; the rapidity and the duration of the fire; the distance to the object, its size, and formation; whether it is moving or not, and, finally, whether the artillery itself is under fire. The efficiency of the fire can be regarded as commencing with the first shot if the chief of the battery gets the distance exactly from the batteries that already have the range. Otherwise time for finding the range must be taken into consideration. In judging this the umpire must consider whether the ground before the object favors finding the range or makes it difficult. In front of a well-maintained and properly directed artillery fire closed infantry detachments of the strength of a company can only stop inside 2,000–1,500 meters when the hostile artillery itself is engaged by artillery or infantry in an effective manner. Between 1,500–1,000 meters infantry detachments unless covered from the fire can only move in open order or in line and only forward or backward.

Artillery can, at a distance of 1,000 meters, still protect itself against an infantry firing line. If, however, it advances to a distance of 800 meters against artillery under fire, the latter must, if it is not sufficiently protected by its own infantry, limber up or expose itself to be put out of power to move. Closed bodies of cavalry of the strength of squadrons can halt only at a distance of 2,000–1,500 meters under the same conditions as already stated for artillery. At 1,500–1,000 meters bodies of cavalry in close order can not move at a walk; inside of 1,000 meters from artillery in action cavalry in close order can only move at a rapid pace; inside 600 meters only at a charge. At a distance of about 2,400 meters artillery which has found its range can make it difficult, in some circumstances impossible, for even a superior defensive force of artillery to unlimber. Artillery can rarely produce a decisive effect on artillery without the cooperation of other arms at distances over 2,400 meters, unless it is much superior in strength. At a distance of less than 2,400 meters a less superiority will make itself felt. When the artillery is not of equal strength on each side the decision should be made more quickly in proportion as the distance is smaller. Flank fire from artillery must be estimated to be more effective.

A detachment of infantry of 100 rifles, itself under fire, and under normal conditions, causes the following loss of men (horses) per minute to the adversary:

Distance meters.	Column.		Infantry.						Firing line.		Artillery, unlimbered, front fire.		Cavalry.	
			Two ranks.			One rank.								
	Standing.	Kneeling.	Standing.	Kneeling.	Lying.	Standing.	Kneeling.	Lying.	Standing.	Lying.	Without horses.	With horses.	Column.	Line.
Short distance, 300–600	9.3	5.9	8.6	4.9	2.7	4.6	2.9	1.5	1.3	1.0			13.6	11.2
Middle distance, 600–1,000	3.4	1.9	2.8	1.5	0.8	1.5	0.8	1.5	0.4	0.2	0.9	2.1	5.6	3.7
Long distance, 1,000–1,500	1.7	1.2	1.2	0.7	0.4	0.7	0.4	0.2	0.2	0.1	0.4	0.8	3.8	1.7
1,500–2,000	0.9	0.6	0.5	0.2	0.1	0.2	0.1	0.1			0.1	0.2	1.8	0.6

NOTES.

1. The average rapidity of fire is for normal firing: At short distances, 5 shots a minute; at middle distances, 3–4 shots a minute; at long distances, 1–3 shots a minute. For rapid fire at short distances, 8; at middle, 5–8; at long, 3–5 shots a minute.
2. If the hostile detachment is moving, the losses are reduced to one-half.
3. The effect of stronger fire can be taken at half greater than normal fire.
4. If the firing detachment is not fired at itself, the effect can also be taken at half greater than normal fire.
5. If in the table given numbers are multiplied by 20, they will express the result which can be expected in peace practice.

A field battery of six guns, itself under fire, causes under normal circumstances the following loss of men (horses) per minute to the adversary—shrapnel fire:

Distance.	Infantry.			Artillery.		Cavalry.
	Column.	Two ranks.	One rank.	Firing line.	Unlimbered.	
Meters.						
800	27.516	323.312 56.0	12.56.7 3.7	3.2 2.3		45.931.3
1,000	23.314	318.010 04.7	10.04.7 3.3	2.7 2.0	5.3 12.0	42.724.7
1,500	16.711	710.7 5 32.7	5.32.7 2.0	1.3 1.0	2.7 5.3	38.313.3
2,000	17.611	8 8.0 4 01.2	4.02.8 1.2	1.2 1.2	2.0 4.0	30.010.4
2,500	14.0 8	0 7.0 3. 31.6	3.81.9 1.2		1.8 3.6	
3,000					1.6 3.2	
3,500					1.0 2.0	
4,000					0.9 1.7	
4,500					0.8 1.5	

NOTES.

1. The rapidity within 1,500 meters is taken at 10 shots a minute. Between 1,500 and 3,000 meters at 6 shots a minute, and over 3,000 meters at 4 shots a minute. For rapid fire the rapidity can be taken at 10 shots a minute.
2. If the hostile detachment is moving, the losses are reduced to one-half.
3. The effect of rapid fire at distances over 1,500 meters may be assumed to be one-half greater.
4. If the battery firing is not itself under fire, the effect at all distances may be taken at one-half greater.
5. If the numbers given in the table are multiplied by 10 they will express the result which can be expected in peace practice.

MARKING OF WOUNDED DURING THE MANEUVERS.

For the practice of the hospital corps, the fighting divisions furnish a number of troops, about 5 per cent, divided as equally as possible into smaller detachments, to be marked with patches made by the division surgeons, indicating that the men are slightly or severely wounded. Each patch is numbered and the diagnosis is indicated upon it, taking care that at least every second wounded man comes in under the designation "slightly wounded." In accordance with calculations of loss already made, the umpires can, during the fight, decide that a number of the troops already marked shall be left on the field of battle, otherwise the chiefs of companies, and in exceptional cases the chiefs of battalions, decide after their own judgment the number of wounded.

KILLED.—If, for instance, it is decided that in a company three men shall be killed, those of the troops which have the three lowest numbers on the patches are left on the field of battle. If later on a further loss of three men is to be marked the troops which have the next three numbers on the patches are left. Those marked as wounded are taken up and transported as really wounded, whereby the treatment, dressing, etc., is practiced or demonstrated to as great an extent as the case may permit. For carrying off the wounded only the hospital corps' own means of transport are to be used, wagons must not be obtained by requisition from the other troops or hired from civilians. Those of the wounded who are marked "slightly wounded" are to be sent from places where their wounds are dressed back to their division as soon as possible; the severely wounded are sent from the field hospital back to their divisions as soon as possible. If in exceptional cases any of the troops that are brought to the field hospital are not able to get back to their divisions in good time, after it has gone into bivouac for the night, they are to be kept and fed at the hospital until the following day. The troops that are sent back to their divisions should, as far as possible, be conducted by a noncommissioned officer of the hospital corps.

THE RUSSIAN ARMY MANEUVERS IN THE DISTRICT OF ST. PETERSBURG IN 1901.

[REPORTED BY CAPT. S. L'H. SLOCUM, EIGHTH CAVALRY, UNITED STATES MILITARY ATTACHÉ AT ST. PETERSBURG.]

The limits of the country embraced in the scheme of the maneuvers were indicated by the city of Reval on the west and that of Viborg, in Finland, on the east, with the capital, St. Petersburg, the objective, occupying an approximately central position. The zone of operations was practically bounded on the south by the railway line, St. Petersburg, Gatchina, Reval. The country thus embraced is flat and densely wooded, with few main but many country roads. It afforded few opportunities for deploying, and rendered the scouting and reconnoitering work comparatively simple, as the columns were confined to the roads.

THE GENERAL SCHEME.

Of the two opposing forces, one was designated the Western army and the other, the Eastern army. The object of the Eastern army was the defense of the capital which was threatened by the Western army.

GENERAL SUPPOSITION.

The Western or hostile army was supposed to have possession of the sea, its fleet having defeated that of the enemy, to have made an unopposed descent on the coast at Reval, and occupied Vezenburg, where it was awaiting the arrival of reenforcements by sea. Its object was the capture of St. Petersburg. The fleet covering its descent was anchored in the roadstead of Reval. This army was commanded by General Baron Meyendorff, and was composed of 55½ battalions, 24 squadrons, 110 guns.

General Adamovich commanded the Eastern army, which was composed of 59 battalions, 29 squadrons, 120 guns. He distributed his main forces in St. Petersburg, Kronstadt, and Krasnoye Selo, having advanced in order to defend the coast and observe the enemy. Detachments watched the whole coast line from Viborg, on the northern coast of the Gulf of Finland, to the mouth of the river Puhaeggi, on the southern coast, 27 miles from the town of Narva.

The commander of the Eastern army was aware of the landing of the enemy at Reval and of his occupation of Vezenburg. Further, from information obtained, he might expect additional hostile forces to land somewhere on the northern or southern coast of the Gulf of Finland.

In order to guard the coast, General Adamovich had at his disposal a detachment of torpedo boats and several coast-defense cruisers, whose movements were controlled by the navy department and the coast guard with its telegraph.

SPECIAL SUPPOSITION.

The railways Viborg-St. Petersburg and St. Petersburg-Reval were considered out of bounds, and could be used only for the transport of supplies.

His imperial highness the Grand Duke Vladimir was in supreme command of the maneuvers.

Positions were taken by the opposing forces on July 31, and on the evening of August 1 scouting began. The main forces of the two armies were on this date 250 versts from each other. On the first three days—the 2d, 3d, and 4th of August—the advance guards of the two armies were approaching each other. On the 5th the advance guard of the Western army came in contact with detachments of the Eastern army—4½ battalions, 12 guns, and 2 sotnias—who were watching the coast from the mouth of the Puhaeggi to Cape Kolganpia. These were forced to retire.

On the morning of the 1st the forces—1 regiment and 4 guns—guarding the approaches to the bridge across the Narova were driven back, destroying (theoretically) the bridge in their retreat. The Western army advanced to the river preparatory to crossing it. The cavalry (13 squadrons and 12 guns), under General Scalon, was near the village of Rigi, 6 versts north of Narva. After crossing by a pontoon bridge, it was to advance up the river Luga, seize the ferry between Sala and Koshkino, collect transport from the country, and reconnoiter along the Luga. The advance guard (8 battalions, 20 guns, and 6 squadrons), under Major General Dubenski, advanced along the Narva highway to take possession of the city and bridge. The main forces advanced in two columns. The right column (16 battalions, 24 guns, and 1 squadron), under Lieutenant General Bormin, followed the advance guard. The left column (14 battalions, 32 guns, eighteenth sapper battalion, half battalion of pontonniers, and 1 squadron of dragoons), under Lieutenant General Skariatin, was to throw a pontoon bridge across the Narova at Rigi, and join later with the right column at Ory (Orli ?), on the Luga, where they were to prepare a floating bridge. At 11.30 a. m. the cavalry and the left column began crossing the pontoon bridge at Rigi. By 2.30 p. m. the Narva detachment of the Eastern army had retreated some distance beyond Yamburg. The right column remained in position on the hills surrounding Narva until the time limit prescribed by the umpires for repairing the bridge (three hours) had expired.

On the morning of the 8th the main body of the Western army, which had partially crossed the Narova River in the vicinity of Narva, was divided into two bodies, 14 battalions, 32 guns, and 1 squadron on the right bank of the Narova River near the village of Popovka, and 16 battalions, 24 guns, and 1 squadron on the left bank in the environs of Narva. The rifle brigade of the guards, with 20 guns and 1 battalion of sappers, had advanced to the river Luga at the village of Izvoz. The cavalry (15 squadrons and 12 guns), a portion of which had crossed the Luga, were bivouacked at the villages of Koshkino, Sala, and Pulkova. On the evening of the 8th the Western army occupied Yamburg without encountering any resistance.

The Eastern army, on the same day, was occupying the villages of Biegunitsi, Teshkovo, and Loshkovitsi, with its advance guard at Gomontova.

General Adamovich was aware of the fact that reenforcements for the enemy were on the sea, seeking a point for descent on the coast somewhere east of Reval out of range of the guns at Kronstadt. The supposition was that they would land on the southern coast.

If this should occur, Pernovo or its near vicinity seemed to be the most likely place, as a main road led directly from this coast village to Biegunitsi, at which point it joined the main road from Yamburg, on which the main body of the enemy was advancing, thus allowing the two hostile forces to unite. He therefore threw up strong intrenchments at Gomontova, with strong detachments of observation on the road leading to the coast via Kaporie. The Narva forces retreated to Gomontova and joined the 12 squadrons and 12 guns at that point.

On this date, the 8th, the Eastern army had, on the southern coast of the Gulf of Finland at the village of Tenteleva, a detachment of 4 battalions, 12 machine guns, and 2 sotnias, and on the northern coast, near Björk-Ö, 8 battalions, 24 howitzers, and 6 squadrons of Finnish dragoons.

On the 6th, the twenty-third division with its artillery, 16 battalions and 12 rapid-fire guns, representing the reenforcements of the Western army, had embarked at Reval, and on the 7th of August the whole squadron, in command of Rear Admiral Rozhdestvenski, steamed in an easterly direction. The transports were eight private steamers, chartered for the purpose in Denmark, and three government transports. The convoying squadron was composed of the coast-defense battle ships *Admiral Seniavin*, *Admiral Ushakov*, *Admiral Lazerev*, and the *Admiral Greig*, with the cruisers *Pamiat Azova* and *Minin.*

Upon leaving Reval the commander of the squadron received orders to arrive at 9 o'clock on the morning of the 8th on the meridian of the island of Leskar (Seskar?), where he was met by the grand duke, commander in chief. At Leskar (Seskar ?) the commander in chief ordered the squadron to Björk-Ö-Sund to disembark the troops at the village of Björk-Ö, which was done under cover of the guns of the squadron. This landing force came in contact late in the afternoon with a detachment of 2 battalions and 6 guns of the Eastern army under General Kasherininov which occupied a position near Björk-Ö. The latter being greatly outnumbered were forced to retire in the direction of St. Petersburg. During August 9, which was a day of rest, there was no movement of troops. On the morning of the 10th the main forces of the Eastern army were still at Biegunitsi, Teshkovo, and Gomontova, but upon receiving the information that a descent had been made by the hostile army on the 8th at Björk-Ö; General Adamovich felt obliged to fall back to Krasnoye Selo in order to cover St. Petersburg more effectually.

On the evening of the 10th the main portion of the Eastern army was situated as follows: Eight battalions, 14 guns, and 1 squadron at the village of Diatlitsi; 13½ battalions, 56 guns, and 1 sotnia at Vitino and Glukhova; the rear guard, 8½ battalions, 12 guns, and 4 squadrons, at Kaskovo, and the cavalry, 14 squadrons and sotnias, with 12 horse artillery guns, at Great Teshkovo.

In the meanwhile the Western army on the 10th continued to advance, and on the evening of that day bivouacked as follows: The cavalry, 20 squadrons, and 12 horse artillery guns at the village of Miestanov; the advance guard, 6½ battalions, 20 field guns, and 2 squadrons, at Chirkovitsi; the right column, 16 battalions, 24 field guns, and a half squadron, at Ilieshi; the left column, 16½ battalions, 32 field guns, and a half squadron, at Little Korchani. Meanwhile, the twenty-third division, after its descent at Björk-Ö, advanced rapidly along the coast road toward St. Petersburg. The fleet left Björk-Ö-Sund on the morning of the 10th, appeared at 10 a. m. in front of Kronstadt and made a vigorous attack upon the fortress.

During the 11th the retreat of the Eastern army continued to Krasnoye Selo. On the evening of this day the main forces of the Eastern army, reenforced by the Tenteleva detachment, 1 battalion of sappers, and 4 squadrons of Finnish dragoons from the Viborg detachment, which had marched 133 miles in three days and looked as fit as possible when they arrived, were in position at Krasnoye Selo; a total of 35 battalions, 86 guns, 27 squadrons, with rear guards at Visotskoye, Rudemulli, and Kipen. One battalion of sappers was at Sestroretsk, and 15 battalions of the twenty-fourth division were garrisoning St. Petersburg.

The advance guard of the Western army was at Diatlitsi; the right column was at Antashi; the left at Klasina, and the cavalry at Ropsha. The twenty-third division had reached Vammels, about 35 miles from the capital.

The following day, the 12th, was a day of rest.

On the 13th, General Adamovich decided for the protection of the capital to occupy and fortify the position to the west of Krasnoye Selo. In the center, from the Ropsha highway to the redoubt at the village of Rautela, were placed 66 guns of the Constantine artillery school, the first and second artillery brigades, the guard reserve batteries, and two batteries of the Pavlov, St. Petersburg cadets, and Nicholas artillery schools. On the right, extending to the village of Pigileva, were posted the Moscow and Grenadier regiments, the Michael artillery school, three batteries of the twenty-fourth artillery brigade, and a half sotnia of the Nicholas cavalry school. On the left were posted the Izmailovski and Yegerski regiments with a sotnia of the Nicholas cavalry school. The general reserve of 17 battalions, under Lieutenant General Meshetich, was posted in rear of the right flank. The cavalry, under Lieutenant General Zikov (25 squadrons of 12 guns), after reconnoitering the enemy and ascertaining the direction of his advance, were to take position on the right flank. On the north, the Viborg detachment, reenforced by 5 battalions from the twenty-fourth division, which was in the capital, making a total of 13 battalions, 24 guns, and 2 squadrons, halted on its retreat at Pargolovo and there made a stand.

General Meyendorff advanced his main forces for an attack in front of Krasnoye Selo in the following manner: The cavalry to the north of Ropsha against the enemy's right flank and rear; the advance guard against Ropsha and Khimozi; the left column, the thirty-seventh division, thirty-seventh artillery brigade, and a half squadron to follow the advance guard for an attack north of the Ropsha highway; the right column was directed toward Kipen and Krasnoye Selo to attack south of the highway. One brigade of the twenty-second division acted as reserve in rear of the left column. General Meyendorff's attack on the enemy's right flank, if successful, would throw the Eastern army to the south, off of its line of communications, and leave a clear road for the Western army to the capital.

That this attack against his right flank was expected is evident from General Adamovich's dispositions. On the north the attack against Pargolovo by the descent column of the Western army was unsuccessful.

About 12 o'clock the artillery of the Eastern army opened fire upon the approaching enemy who was supported by the artillery of his advance guard which took position on the heights of Ropsha and was rapidly reenforced by the remainder of the artillery. Under cover of this artillery fire the Western army formed for an attack which took place all along the line. The men in successive lines charged toward the intrenchments, with little attempt to deploy into open order.

This advance was met by a counter-attack of the general reserve in mass. At about 1.30 "cease firing" was sounded by the commander in chief.

COMMENTS.

Although the detailed movements of the opposing armies were unknown to each other, it was known in advance that the main battle would probably take place at Krasnoye Selo in presence of the imperial family.

This fact alone made it evident that one army was expected to retreat to this point while the other advanced. This eliminated almost all power of strategical initiative on the part of either commander, though they were given much freedom in the tactical movements of the advance and retreat.

These grand maneuvers are very rightly considered by the Russians as serving only for the instruction of general officers and the staff, as the time allotted and certain imperial requirements do not allow of a careful or detailed instruction of the different units in the science of war. This is thoroughly done just before the grand maneuvers in the company, regiment, brigade, and division, to each of which a certain period is apportioned in the annual instruction order. The foreign attachés were invited to witness only the grand maneuvers, so of the smaller ones mentioned above I can not speak from personal observation, though the course of instruction laid down for them is most comprehensive and thorough.

The military attachés were at first invited to be present only on the 7th and 8th of August, and on the evening of the latter day we all returned to St. Petersburg, it being intimated to us that we should be again invited to witness the operations on the final day before Krasnoye Selo. A few hours after our arrival at St. Petersburg a general staff officer informed us that, by his majesty's personal order, he had come to say that if we desired we could be attached by allotment to the headquarters of the two armies and remain with them until the completion of the maneuvers. Seven of the ten military attachés accepted and started at once. I was assigned to the headquarters of the Eastern army, protecting St. Petersburg. It is worthy of remark that this is the first time that military attachés have ever been allowed to be attached to the troops during maneuvers, having been in previous years invited only to accompany the emperor for certain reviews and inspections. It should be noted that, besides the grand maneuvers of the troops of the district of St. Petersburg, grand maneuvers in eight other districts of the empire were held.

At the points of contact of the opposing armies, other than those of small parties of the advance and rear guards, namely, Narva and Krasnoye Selo, the imperial family was present. Consequently the engagements were made as spectacular as possible and things were done which nobody would expect troops to do in actual warfare. The maneuvers in the eight other districts, where the imperial family was not present, were conducted on correct principles.

All the supply wagons were requisitioned from the country and consisted of every conceivable variety and of most primitive kinds.

A most excellent thing in the supply system is what is known as soup wagons, which follow the units on the march and have warm nourishing soup ready at all times. A soup wagon has a vertical boiler on two or four wheels, depending upon its size, with a constant fire going during the march.

The troops were billeted generally in the villages. In the equipment of the Russian troops, upon which I have previously reported, I can see nothing worthy of imitation by us.

Their habit of singing upon the march is most cheering.

The working of the general staff, an organization of which we are in such deplorable need, was most excellent during the maneuvers. I doubt whether it has its superior in any army in the world.

SWISS MANEUVERS OF 1901.

[Reported by Maj. G. B. Cecil, Third Infantry, United States Military Attaché at Bern.]

The Swiss maneuvers for 1901 took place in the country to the north of Bern and southeast of the Jura Mountains. The river Aar formed the northwest limit of the theater of operations, while the Emme is the largest and most important stream flowing through it. The terrain is undulating, with a fair division of woodland, but at ordinary times passable in all the cleared portions by troops of all arms; and through the woodlands there are many country roads. Rain had fallen almost continually, since the first of the month some time during every day, and continued during the entire maneuvers, till the soil was thoroughly saturated and little brooks had become in some instances impassable streams, overflowing their banks and flooding the valleys. The cultivated ground and in many instances the pastures were impassable for cavalry and artillery, while for the foot troops the marching, when off the main road, was very trying and exhausting even for short distances. Owing to this bad weather and the condition of the country new factors entered into the problems of nearly every day's operations.

The following foreign officers had been designated to attend the maneuvers:

Germany—Major General Freiherr von Vietinghoff, Major von Besser.

France—General of Brigade Debatisse, Captain of Artillery Nudant, Commandant de Kerraoul.

Italy—Colonel de Robilant, Captain Ropolo.

Russia—Major General Rosen.

Sweden and Norway—Captain Roeder, Captain Monrad Aos.

United States—Major Cecil.

England—Lieutenant Colonel Buist.

Switzerland detailed Colonel Alfred de Tscharner and Captain Scheibli of the general staff to accompany the visitors.

The troops employed for the maneuvers included the entire second army corps, until the last two days, when a combined division taken from the first army corps was brought in, representing a part of a hostile force against which the corps operated. The troops of the corps were supplied with 100 rounds of blank cartridges per man for the infantry, to be expended, 15 during the preliminary course, 30 during the brigade maneuvers, and 55 during the division and corps maneuvers. Each battery was given 780 blank cartridges to be expended, 30 during the preliminary course, 290 during the brigade, and 480 during the division and corps maneuvers.

Every soldier carried his prescribed packs and one emergency ration, to be consumed only when ordered; and a part of the troops were provided with the new shelter tents which modified the packs, making the load of the foot soldier a little over 60 pounds. In addition, two men of each squad carried little bundles of fire wood.

The following orders were issued September 9:

HEADQUARTERS OF THE SECOND ARMY CORPS,
Langenthal, September 9, 1901.

TO THE COMMANDERS OF THE THIRD AND FIFTH DIVISIONS:

In order to raise the fitness of the troops in the second army corps maneuvers of this year to the highest possible standard, it is necessary that the day of rest, September 11, be made the best possible use of, and this not only for the purpose of restoring physical energy and strength, but particularly for attending to those details which may have been neglected and which are indispensable for the proper maintenance of discipline and the fighting capacity of the troops.

I therefore desire that the troops and trains shall reach their cantonments in good season on September 10, so that there may still be time on that day to do thoroughly the work of "interior service."

On September 11 a careful revision of the equipment, boots, horses, and vehicles must take place and the necessary repairs be attended to. The uniformity of the uniforms, and particularly the manner of carrying the new infantry accouterments, leave much to be desired.

Further, exercises must be gone through, in the section and in the units (company, battery, etc.), which are likely to improve the precision of the troops (rifle drill, loading, exercises, parade marching, fire discipline, etc.).

On the evening of September 11 all the units must be in irreproachable condition and quite fresh. It is expected of officers of all ranks that they also enter the larger maneuvers rested and in possession of unimpaired mental and physical strength.

The commander of the second army corps:
(Signed) FAHRLÄNDER.

Total strength of the second army corps was about 26,000 men.

The general idea, as announced, is that a Red army has crossed the Jura Mountains with a view of attacking a White army concentrated around Bern. The left of the Red army, the maneuver division, has driven the outposts across the Aar.

The composition of the third (White) division (Colonel Bühlmann) for September 11 and 12 was as follows:

- Fifth infantry brigade (Colonel Will)—
  - Ninth infantry (3 battalions).
  - Tenth infantry (3 battalions).
- Sixth infantry brigade (Colonel von Wattenwyl)—
  - Eleventh infantry (3 battalions).
  - Twelfth infantry (3 battalions).
- Third rifle battalion (sharpshooters).
- Third company guides (special cavalry).
- Third dragoons (3 squadrons).
- Third field artillery regiment—
  - First battalion (2 batteries).
  - Second battalion (2 batteries).
- Tenth field artillery regiment—
  - First battalion (3 batteries).
  - Second battalion (fifty-second battery).
- Third engineer half battalion (sapper companies 1 and 2).
- Division field hospital (ambulances 11, 12, 13).
- Ambulance train company (first section).
- One section of cyclists (headquarters).

The composition of the fifth (Red) division (Colonel Scherz) was as follows:

- Ninth infantry brigade (Colonel Iselin)—
  - Seventeenth infantry (3 battalions).
  - Eighteenth infantry (3 battalions).
- Tenth infantry brigade (Colonel Bertschinger)—
  - Nineteenth infantry (3 battalions).
  - Twentieth infantry (3 battalions).
- Fifth rifle battalion (sharpshooters).
- Fifth company guides (special cavalry).
- Fifth dragoons (3 squadrons).
- Fifth field artillery regiment—
  - First battalion (2 batteries).
  - Second battalion (2 batteries).
- Fifth engineer half battalion (sapper companies 1 and 2).
- Division field hospital (ambulances 21, 22, 23).
- Ambulance train company (second section).
- One section of cyclists (headquarters).
- Pontoon division—
  - Second battalion (first pontoon company).

For the maneuvers of division against division the following orders were issued by the commander from Langenthal on September 10:

Initial situation of the White (third) division.

1. The Red army emerged from the Jura defiles with strong vanguards on September 11.

2. The White army was concentrated in a semicircle to the north of Bern. Its vanguards (supposed), being driven back from the Jura, hold the Ziehl-Aar line from the lake of Neuchâtel to the mouth of the Emme.

3. A White division forming the right wing, consisting of the third division reenforced by the third dragoons, first battalion of the third field artillery regiment, and the fifty-second battery, came out of the valley of the Emme and reached, with its cavalry, Kirchberg, and with its vanguard, Burgdorf.

Directions for the maneuvers.

The third division, after the close of the preliminary exercises on September 10, will move into the locations corresponding to the initial situation, taking into consideration the position to be taken by the outposts on September 11.

The infantry outpost line will not go beyond Sommerhaus to the north.

The third dragoons will be at Kirchberg on the afternoon of September 11, and the first battalion of the tenth field artillery regiment, and the fifty-second battery will be at Lauperswyl at 2 p. m., at the disposal of the third division.

With the commencement of the state of war on September 11, at 7 o'clock in the evening, the reconnoitering and the service of the outposts will begin.

On the afternoon of September 11 the third division will receive orders for September 12.

The state of war will continue uninterruptedly until after the close of the maneuvers on September 14.

Cessation of fighting, retiring to rest, placing the outposts, and resuming action must be conducted on strictly warlike lines.

The parties must immediately send a copy of each tactical order, by a cyclist, to the director of maneuvers.

The staff of the army corps will send copies of the orders to the war department, the umpires, etc.

COMMANDER OF THE SECOND ARMY CORPS.

LANGENTHAL, *September 10, 1901.*

Initial situation of the Red (fifth division).

1. The Red army has driven back the enemy's vanguard from the Jura Mountains to behind the Ziehl-Aar line. Extensive concentrations of troops are reported to have taken place in the neighborhood of Bern.

2. The Red division forming the left wing (fifth division), reenforced by the fifth dragoons and the second company of pontoniers of the pontoon division, which debouched near Oensingen and on September 11 successfully crossed the Aar on a pontoon bridge at Wangen (where the bridges had been destroyed), was undisturbed by the enemy.

It pushed its outposts forward as far as the railway line Derendingen-Herzogenbuchsee. Its cavalry was at Herzogenbuchsee on the evening of September 11.

Directions for the maneuvers.

On the termination of the exercises on September 10, the fifth division will move into the locations corresponding to the initial situation and to the positions to be taken by the outposts on the evening of September 11.

The fifth dragoons will be at Herzogenbuchsee on the afternoon of September 11, and the second company of the pontoon division will be at Wangen, at the disposal of the fifth division.

With the commencement of the state of war on September 11, at 7 o'clock in the evening, the reconnoitering and the service of the outposts will begin.

On the afternoon of September 11, the fifth division will receive orders for September 12.

The state of war will continue uninterruptedly until the close of the maneuvers on September 14.

Cessation of action, retiring to rest, placing the outposts, and resuming action must be conducted on strictly warlike lines.

The parties must send a copy of each tactical order, by a cyclist, to the director of maneuvers.

The staff of the army corps will send copies of the orders to the war department, umpires, etc.

COMMANDER OF THE SECOND ARMY CORPS.

LANGENTHAL, *September 10, 1901.*

Plan of location for September 11 and 12.

SECOND ARMY CORPS.

Corps staff—Langenthal.
Second cavalry brigade staff—Langenthal.
Tenth company guides—Langenthal.
Tenth field artillery regiment staff—Rüderswyl and Lauperswyl.

COMPOSITION AND LOCATION OF THE OPPOSING FORCES.

Third (White) division.

Division staff—Oberburg.
Fifth brigade staff—Burgdorf.
Ninth infantry—Burgdorf.
Tenth infantry—Oberburg..
Sixth brigade staff—Kalchofen.
Eleventh infantry—Häsli, Ruegsau.
Twelfth infantry—Lützelflüh, Nieder, Goldbach.
Third rifle battalion—Burgdorf.
Third company guides—Burgdorf.
Third dragoons—Kirchberg.
Third field artillery regiment staff—Oberburg.
First battalion—Burgdorf.
Second battalion—Oberburg.
Tenth field artillery regiment, first battalion plus fifty-second battery—Rauflüh, Zollbrück.
Third engineer half battalion—Oberburg.
Third division field hospital—Kalchofen, Burgdorf.

Fifth (Red) division.

Division staff—Wangen on Aar.
Ninth brigade staff—Deitingen.
Seventeenth infantry—Deitingen.
Eighteenth infantry—Wangenried, Röthenbach, Inkwyl.
Tenth brigade staff—Wiedlisbach.
Nineteenth infantry—Walliswil, Heimenhusen.
Twentieth infantry—Wiedlisbach.
Fifth rifle battalion—Luterbach.
Fifth company guides—Wangen on Aar.
Fifth dragoons—Wangen on Aar.
Second Maxim gun company—Wangen on Aar.
Fifth field artillery regiment staff—Deitingen.
First battalion—Walliswil.
Second battalion—Heimenhusen.
Fifth engineer half battalion—Luterbach.
Fifth division field hospital—Attiswil.
Pontoon division second battalion (first pontoon company)—Wangen on Aar.

Order for the third division for September 12, 1901.

1. Hostile troops of all arms of the strength of a division have to-day crossed the Aar below the mouth of the Emme.

2. Our army to-morrow will complete its evolution on the line Jegenstorf-Schupfen-Frienisberg.

Our vanguard has been thrown back behind the Aar. Its right wing occupies the heights to the south of Solothurn.

3. The third division is hereby ordered to force the enemy, who has crossed the Aar to the east of the Emme, back across that river to-morrow, September 12.

Directions for the maneuvers.

ARMY HEADQUARTERS, BERN, *September 11, 1901, 2 p. m.*

ARMY COMMANDER (WHITE):

The line of outposts must not be passed by cavalry in any great number before 6 a. m. on September 12, nor by the heads of the infantry columns before 8.15 a. m.

The Director of Maneuvers:
(Signed) FAHRLÄNDER.

Order for September 12.

THIRD DIVISION,
Oberburg, September 11, 1901, 6 p. m.

1. Nothing new to report about the enemy or our army.

2. The following troops must be ready to march early to-morrow morning:

Third dragoons at 6 p. m., to reconnoiter within the boundary Burgdorf, Langenthal, Emme (it will receive special orders); the vanguard without point and flankers at 7.45 at the northwest entrance of Burgdorf on the road to Kirchberg; third rifle battalion at 7.45 at the Schutzenmatte; balloon company at 7.45 at Lissach (the ninth infantry will send one company there as guard at 7 a. m.); tenth infantry and the second battalion of the third field artillery regiment in marching formation on the road Oberburg-Burgdorf, head of the column at the crossroads 350 meters to the south of the Burgdorf church; first battalion of the tenth field artillery regiment, plus fifty-second battery and one company of the tenth infantry, at 8 o'clock in Oberburg, head at the crossroads Oberburg-Krauchthal; sixth infantry brigade in marching order at 8 o'clock on the road to Burgdorf, head of the column at the south issue of Oberburg; third division field hospital, less two ambulances, behind sixth brigade.

3. The provision and baggage columns will assemble at 10 o'clock in the morning between Burgdorf and Oberburg. Their positions will be assigned to them by the train officer of the division.

The commanders who are placed directly under the division commander will receive their orders at 7 o'clock at the west entrance of Burgdorf on the road to Kirchberg.

Vanguard (Colonel Will); ninth infantry, third company guides.
First battalion of the third field artillery regiment.
Third engineer half battalion, ambulance 13.

Commander of the Third Division:
(Signed) BÜHLMANN, *Colonel.*

Order for the fifth division for September 12, 1901.

1. Detachments of the enemy's rear guard are still holding the right bank of the Aar to the west of the mouth of the Emme. Strong concentrations of troops are taking place near Bern-Burgdorf.

2. Our army will concentrate to-morrow near the Aar, and the vanguard will try to gain a firm footing on the right bank of the river.

3. You will endeavor to assist us in our fight for the Aar crossings by making a vigorous advance in the direction of Kirchberg.

Directions for the maneuvers.

ARMY HEADQUARTERS,
Sonceboz, September 11, 1901, 2 p. m.

ARMY COMMANDER (RED):

The outpost line will not be passed on September 12 by strong detachments of cavalry before 5.30 a. m. nor by the heads of the infantry columns before 8 a. m.

The Director of Maneuvers:
(Signed) FAHRLÄNDER.

Order of assembly for September 12, 1901.

FIFTH (RED) DIVISION,
Wangen on Aar, September 11, 1901, 4 p. m.

1. Troops of the enemy's vanguard still hold the right bank of the Aar to the west of the mouth of the Emme. Strong concentrations of troops are reported near Bern and Burgdorf.

2. The vanguards of our army on our right will to-morrow try to gain a firm footing on the right bank of the Aar. We must endeavor by a vigorous advance in the direction of Kirchberg to facilitate the vanguard's fight for the Aar crossings.

3. For this purpose the vanguard will be at 7.45 a. m. on either side of the Inkwil road station, in rendezvous formation according to the orders of the vanguard commander.

At the same time the main body will be in rendezvous formation, in the order indicated hereafter, on the Inkwil road, through letter "e" of the word "Rötenbach" (map 1 : 100,000) Wangenried-Wangen-Wiedlisbach: Head of the main body at the south exit of Inkwil; head of the twentieth infantry at the meeting of the roads Wazenried-Rötenbach and Wangenried-Inkwil; head of the seventeenth infantry at the north exit of Wangenried.

The ammunition column of the main body will assemble on the field path, from south of letters "en" in Wangen to point 433 north of Wangenried. Meat wagons at the tail of the column.

4. The outposts will be withdrawn at 6 a. m. The commander of the vanguard must insure the safety of the "rendezvous." The commander of the fifth dragoons will report in person at division headquarters at 6 p. m. to-day for special instructions.

5. The wagons of the provision and baggage columns, including the field post, will be at 9 a. m. in single file in the order indicated in the marching order, on the road Wangen-Wiedlisbach, where further orders must be awaited and an exchange of mail can take place.

6. The third ambulance of the division field hospital will establish a field hospital at Wangen.

7. The pontoon company will remain at Wangen until further orders are issued for the protection of the pontoon bridge.

8. Orders will be issued near the Inkwil station at 7.30 a. m. on September 12. All the adjutants general of brigades, regimental adjutants, the commanders or adjutants of the fifth rifle battalion, the fifth company of guides, the fifth engineer half battalion, the fifth division field hospital, the commander of the train, and one section of the fifth company of guides must be present.

Order of troops: Vanguard (Colonel Iselin); eighteenth infantry, one squadron of the fifth dragoons, first company of sappers of the engineer half battalion, one ambulance, ammunition train. Main body (Colonel Bertschinger); two sections of guides, fifty-fifth battalion of the nineteenth infantry, second company of sappers of the fifth engineer half battalion, first battalion of the fifth field artillery regiment, one company of the fifty-sixth battalion of the nineteenth infantry, second battalion of the fifth field artillery regiment, rest of fifty-sixth battalion, fifty-seventh battalion of the nineteenth infantry, twentieth infantry, seventeenth infantry, ambulances, ammunition train.

The Commander of the Fifth Division:
(Signed) SCHERZ.

OPERATIONS OF SEPTEMBER 12.

Reference to the map of the theater of operations and the foregoing orders will disclose the situation and instructions of the commanders of the opposing forces clearer than any extracts that could be made from them; they are therefore given in full.

The objective in each case was the opposing division.

The third (White) division from its situation had two routes open to it, in order to reach the fifth (Red) division. That by Winigen was the most direct, but it had the disadvantage that it passed for a distance of about 15 kilometers through a narrow valley, with wooded heights on both sides, not at all favorable for bringing a division into offensive action with any chance of success. The other or longer route by Höchstetten–Winisdorf was chosen, because it had the advantage that it kept the left in touch with the supposed army and offered better positions for battle.

The movement commenced according to the order at about 8 a. m., September 12, the division moving in a single column along the road via Höchstetten–Hellsau, with the third rifle battalion on the road to Winigen and the cavalry covering the entire front.

The commander of the Red division had a greater choice of routes. He selected Inkwil, Aeschi, Winisdorf, St. Niklaus, Kirchberg.

At 8 a. m., when the column should have started, the cavalry, though it had been out since 5.30 a. m., had not been able to furnish any definite information as to the movements of the enemy. In the absence of definite information the commander concluded to march his division on Hüniken, thence through the fields to St. Niklaus.

The rain continued without intermission, and the movements off the roads were slow and uncertain. At 8.25 a. m. the advance guard was moved out, but by 9.30 a. m. it became apparent that the wet condition of the soil made the movement impracticable. An effort was then made to return to the original plan by moving via Hersiwil to Winistorf. At 10.45 a. m. the advance guard had reached Hersiwil and the advance guard of the White division was at Seeberg, where each seemed surprised to find the enemy on its flank. The advance guard commander of the Red division placed his artillery on the high ground near Hersiwil, and his infantry lined the crest near Heinrichswil. The artillery of the Red division continued in that position, too far away for effective work.

The advance guard of the White division went into action toward the left, with its two batteries on the flat below Höchstetten. Later it was reenforced by four more batteries, two batteries taking position on the height to the east of Winistorf, where they had an enfilading fire on the right salient of the enemy's line in the edge of the wood west of Heinrichswil. The greater part of the division, composed of four regiments of infantry, made its way through the woods to the west of the road Höchstetten–Heinrichswil against the enemy's right. The greater part of these woods was densely overgrown with underbrush and difficult of passage, but the troops reached its edge, 300 meters from the enemy's line, without the movement's being discovered. There they encountered a ditch full of water, but a heavy fire was kept up against the opposing infantry, while trees were felled across the ditch upon which to cross. The crossing was then rapidly made and the crest taken by assault. The reserve was too late in reenforcing the line. Just about this time the Red division developed an attack on its left under cover of the woods southeast of Heinrichswil, but when it came into the open the judges decided the attack could not succeed in the face of the artillery playing upon it, and the Red division retired behind the line of railway to the north of Etziken. This ended the operations for the day, the most conspicuous feature of which seemed to be the lack of enterprise of the cavalry. On both sides the work of securing information was imperfectly done. The reckless activity of the small bodies of the right wing of the White division would have entailed terrible losses, but this was undoubtedly done to attract the attention of the enemy until the real attack developed.

The White division was unable to utilize the balloon, owing to the rain, and also because the clouds were so low that nothing could have been seen if an ascension had been made.

OPERATIONS OF SEPTEMBER 13.

For this day's action the preponderance of artillery (9 batteries) was allotted to the fifth (Red) division, and five batteries to the third (White) division. The third (White) division was, however, given the greater strength in cavalry.

The following were the orders of the division commanders:

Order for September 13.

Division Headquarters,
Koppigen, September 12, 1901, 7 p. m.

Third (White) Division.

1. The Red army has taken possession of the Aar crossings; its vanguards occupy the right bank. Our army will commence its march toward the Aar to-morrow, September 13; its right wing will march via Jegenstorf–Schalunen.

The enemy, who was in front of our division to-day, has retired in the direction of Etziken and Aeschi.

2. I shall renew the attack to-morrow.

3. The third company of guides, the third dragoons and the fifty-first battery, commanded by Colonel Gugelmann, will leave Utzenstorf at 6.30 a. m. and protect the left flank of the division against the enemy, who has crossed the Aar near Solothurn. They must, if possible, support our attack.

4. The third company of guides will send two officers' patrols to-morrow to division headquarters; the company will be at Hühnerhüsli at 6 a.m. to-morrow, to reconnoiter in front.

5. The following troops will stand ready for action behind the outposts to-morrow at 7.30 a. m. with the ammunition column:

Fifth infantry brigade, third field artillery regiment, one company of sappers, and third rifle battalion, near Mosli, on the road Winistorf–Aeschi, under command of Colonel Will.

Sixth infantry brigade, fifty-second battalion of eighteen infantry, and one company of sappers, near Hersiwil, under command of Colonel von Wattenwyl.

Third division field hospital will be near Winistorf.

The balloon company will be at 7 a. m. near Höchstetten, the balloon to be inflated if the weather is favorable. The fifth infantry brigade will supply a company as guard.

6. The baggage wagon will draw up near St. Niklaus at 10 a. m., according to the directions of the train chief.

7. Distribution of provisions will take place at 9 a. m. at Winigen.

The united provision column will afterwards go to St. Niklaus, where it will join the baggage column, in order of units.

8. Orders will be issued to the commanders of the brigades, third field artillery regiment, third engineer half battalion, and the third division field hospital, at 7 a. m. near Hünerhüsli.

The Commander of the Division:
(Signed) BUHLMANN, *Colonel.*

Marching order for September 13, 1901.

WANGEN ON AAR, *September 12, 1901, 9 p. m.*

FIFTH (RED) DIVISION.

1. Owing to the powerful attack of the fifth division, our vanguard has to-day forced the Aar crossings above Wangen and established itself on the right bank of the Aar.

2. To-morrow, September 13, our army will commence a concentric advance on Bern. We are ordered to accompany the left wing of our army in its advance on Solothurn via Bätterkinden toward Jegenstorf, by pushing the enemy back to the Emme.

3. I shall therefore advance to-morrow with the fifth division in one column in order indicated hereafter, via Inkwil, Aeschi, St. Niklaus, Kirchberg as follows:

(*a*) The vanguard will be ready to march at 7.30 a. m. on either side of the road at the Inkwil station, ammunition column and artillery on the road. The head of the vanguard will pass the railway crossing at Inkwil station punctually at 8 a. m.

(*b*) The main body will pass the railway crossing at Inkwil station at 9 a. m.

The ammunition column of the main body will assemble successively on the roads Inkwil-Wangenried, Inkwil-Subingen, and Inkwil-Heimenhusen, where it will be left behind by the advancing regiments and subdivisions. The train officer will take his command and bring it along behind ambulance 21.

4. In order to guard the advance, the commander of the fifth dragoons will report in person to-night, at 9 o'clock, at division headquarters,

5. The company of pontoniers will remain in Wangen and protect the pontoon bridge.

6. The provision column will assemble on September 13, at 8 a. m., at Wangen station, under the command of the quartermaster of the nineteenth infantry. After the distribution of provisions it will wait there for further orders from the train chief, drawn up in order of march.

The baggage column, under the command of the train officer, will assemble to-morrow, at 9 a. m., on the road Wangen-Wiedlisbach, and will wait there for further orders.

7. The sick depot will be at Wangen.

8. Orders will be issued at Inkwil station on September 13, at 7.30 a. m.

Vanguard: Commander, Colonel Bertschinger.

Troops: Nineteenth infantry, two sections of the fifth guides; two sections of the tenth field artillery regiment, first company of sappers of the fifth engineer half battalion, ambulance 22, ammunition column.

Main body: Commander, Colonel Iselin.

Troops: One group of guides, fifty-third battalion of the eighteenth infantry, second company of sappers of the fifth engineer half battalion, fifth field artillery regiment, a half group of guides, fifty-fourth battalion of the eighteenth infantry, one section of the tenth field artillery regiment, a half group of guides, seventeenth infantry, fifth rifle battalion, twentieth infantry, ambulance 21, ammunition column.

Fifth Division Commander:
(Signed) SCHERZ.

The action began about 8.15 a. m. by an advance-guard combat near Aeschi, which the fifth (Red) division supported, and forced the third (White) division to retire. The White division then placed its artillery on the height near Aeschi, where it had an excellent field of fire to the front. This would have been a good position for the White artillery, but the ground was so soft that it failed to get there in time and was forced to retire. The White division then took up a position on the heights near Höchstetten and Hellsau, from which it was subsequently driven by having its left flank turned. Indeed, the right brigade, with the greater part of the artillery, had to retire through the woods to Alchenstorf, where the further advance of the Red division was checked for the day. While in actual war it might have been possible to have dislodged the White division from the heights of Hellsau and Höchstetten, the movement would have required more careful execution. The artillery of the attack remained out of range, while the artillery of the defense played on the attacking infantry, both in front and on the flanks of the lines, as they advanced in the open. Had the attacking infantry kept out of range of the defender's artillery, the position could undoubtedly have been turned.

The daily papers mentioned a cavalry charge in the early morning that aided materially in forcing the White division to abandon its effort to hold the heights of Aeschi. The balloon was utilized with varying success. It was sent up from Höchstetten in the early morning, but before any definite information had been obtained of the enemy's movements it was hauled down and moved forward toward Seeberg. This change of location lost an important hour of observation, for during that time the enemy passed the clearings and concealed the body of his troops from view. The information acquired from the second position came rather late, except to disclose the necessity for a hasty retreat. The balloon was hauled back to Höchstetten, where it was utilized to observe the movements of the enemy until 12.30 p. m., when it was again retired in the direction of Kirchberg. There was a report that it was captured at Höchstetten, together with an automobile belonging to the headquarters of the White division. Whether true or not it played no further part in the operations of division against division. The rain would have rendered it practically useless the next day.

During the day the following information was given out from the supposed operations of the White and Red armies, which necessitated the retirement of the White division on the line of the Emme.

OPERATIONS OF SEPTEMBER 14.

The orders for this day follow:

MEIKIRCH, *September 13, 1901, 9.30 p. m.*

TO THE COMMANDER OF THE THIRD (WHITE) DIVISION:

1. The advance of the White army met with strong resistance to-day. Our right wing was driven back to the line Fraubrunnen-Mülchi.
2. Close in immediately with the right wing of the main army by taking up a position on the right bank of the Emme, where you can oppose any attempt of the enemy to cross the river.
3. The third company of guides had to be taken away from you, being needed elsewhere.

THE COMMANDER OF THE WHITE ARMY.

Order of Assembly for September 14.

RUMENDINGEN, *September 13, 1901, 7.50 p. m.*

THIRD (WHITE) DIVISION:

1. Nothing new from our army. The enemy is in our front, with his right wing on the line Wiladingen-Koppigen.
2. For the present I shall hold the position south of Alchenstorf.
3. The third dragoons will occupy the bridge near Kirchberg and reconnoiter in the direction of the enemy's right wing. It will receive special orders.
4. The third company of guides will send one officer's and one noncommissioned officer's patrol to the division commander at 5 a. m. to-morrow. They will be near Thumli at 6 a. m., in order to reconnoiter in front.

5. The following troops must be ready to march to-morrow at daybreak: Fifth infantry brigade and one company of sappers near Thumli (the fortifications thrown up this evening will be occupied by a small detachment only); the third rifle battalion near Winigen; sixth infantry brigade and one company of sappers near Tannwald (the loop trenches will be thinly manned); the first battalion of the third field artillery regiment and the fifty-first battery near Thumli, under the command of Lieutenant Colonel Haag; the second battalion of the third field artillery regiment and the fifty-second battery near Tannwald.

6. The division field hospital will remain in Rumendingen.

7. The baggage column will assemble in Alchenflüh at 8.30 a. m. The provision column will join the baggage column in order of units at Alchenflüh.

Orders will be issued at 6 a. m. near Tannhölzli.

THE COMMANDER OF THE THIRD DIVISION.

Order for September 14.

RUMENDINGEN, *September 14, 1901, 4.20 a. m.*

THIRD (WHITE) DIVISION:

The third division will retire toward Ersigen.

The sixth brigade to the west of the road Kirchberg–St. Niklaus.

The fifth brigade to the east of the road Kirchberg–St. Niklaus.

The outpost battalions will remain at Tannhölzli, Tannwald, and St. Niklaus.

The third rifle battalion and the third company of guides will retire to Bickigen as soon as the wagons of the fifth brigade have passed Bickigen. All the wagons will go to Lissach.

Sixth brigade via Kirchberg.

Fifth brigade via Burgdorf.

The wagons carrying engineer material will remain with the troops.

Orders will be issued to the west of Ersigen at 6 a. m.

THE COMMANDER OF THE THIRD DIVISION.

TO THE COMMANDER OF THE FIFTH (RED) DIVISION:

1. The Red army's attack to-day gained ground, particularly on the left wing, where we drove the enemy back to the line Mülchi–Fraubrunnen.

2. In the interest of our operations it is necessary that you should drive the enemy across the Emme and move closer to our left wing.

THE COMMANDER OF THE RED ARMY.

Order of Assembly for September 14.

HELLSAU, *September 13, 1901, 5 p. m.*

FIFTH (RED) DIVISION.

1. The attack of our army has gained ground, particularly on our left wing, where the enemy has been driven back to the line Mülchi–Fraubrunnen.

We have for to-morrow the task of driving the enemy opposing us back across the Emme and of moving closer to the left wing of our army.

2. The fifth dragoons, camping at Kriegstten, will reconnoiter to-morrow morning early the road for the advance in our front, in the valley of the

Limpach, via Fraubrunnen, Jegenstorf, Krauchal, in the direction of Bern. They will also reconnoiter the road for the advance o four left wing in the Emmenthal. Its commander will report in person at division headquarters this evening at 8 o'clock for special instructions.

3. The troops of the fifth division must therefore be assembled in rendezvous formation to-morrow at 6 a. m. in the following order:

(a) Right wing vanguard on the terrace south of the word "Mösli" between St. Niklaus and Mösli; main body at the road Wiladingen-Mösli; artillery and ammunition column on the road.

(b) Left wing vanguard between the words "Unt" and "Alchenstorf" on the map 1:100,000 north of the main road; main body to the south of the word "Höchstetten," artillery in line on the terrace of Rain-Alchenstorf, to the southwest of point 571, ammunition column on the road.

(c) Divisional reserve at the north border of the village of Höchstetten, artillery and ammunition column on the road Höchstetten-Heinrichswil.

4. The vanguard regiments will protect the rendezvous formations of their groups and the fifth rifle battalion that of the divisional reserve. The outpost troops for the nights of the 13th and 14th will be withdrawn after the protection of the rendezvous is established. They will join their organizations by the shortest route.

5. The baggage column will assemble at 8 a. m. on the road Heinrichswil-Hersiwil, where it will await further orders. It will be under the command of the train officer.

The provision wagons, as well as those of the special arms, will be assembled by regiments under the regimental quartermasters. They will proceed to Herzogenbuchsee, where the distribution of provisions and the exchange of mails will begin at 8 a. m., to commence with the left wing of the division.

6. Orders will be issued at 6 a. m. at the vanguard of the right wing.

Order of troops.

(a) RIGHT WING.—Vanguard (Lieutenant Colonel Marti): Eighteenth infantry, two sections of guides, one company of sappers. Main body (Lieutenant Colonel Iselin): Seventeenth infantry, first battalion of the fifth field artillery regiment, ambulance 21, ammunition train.

(b) LEFT WING.—Vanguard (Lieutenant Colonel Weber): Nineteenth infantry, second company of sappers. Main body (Colonel Bertschinger): Twentieth infantry, second battalion of the fifth field artillery regiment, ambulance 22, ammunition train.

(c) DIVISIONAL RESERVE (Lieutenant Colonel Rosenmund): Fifth rifle battalion, tenth field artillery regiment, ammunition train.

The Commander of the Fifth Division:
(Signed) SCHERZ.

The positions taken at Thumli and Tannwald by the third (White) division were prepared for defense with three batteries in each position (the fifty-first battery had been taken from the fifth (Red) and given to the third (White) division); but the order received during the night made it necessary to withdraw. Before daylight the White division had fallen back to a strong position near Ersigen. This was prepared for defense by the construction of shelter trenches and gun pits on the height east of the town, and a small force of infantry and a battery of artillery occupied hill 510 to the west of Ersigen. The greater part of the infantry occupied the woods to the east and a section of engineers constructed a bridge across the Emme to provide against disaster.

The fifth (Red) division marched to the attack in two columns. The right brigade with the artillery kept the plain, its left regiment operating in the edge of the wood, sheltered by its projections. The left brigade advanced through the woods, but found them so cut up by deep ravines that the troops of the different organizations became mingled and in no condition to cope with equal forces, placed at leisure and prepared to resist their advance. The troops on the plain advanced in good order, but were repulsed by the infantry partially concealed and the artillery well placed.

The position was difficult, the weather disagreeable, and the troops so tired that without waiting for a final result the halt was sounded. This ended the maneuvers of division against division. The troops were hurried off to their cantonments to give them a chance to dry their clothing. The critique was held in the rain, at which the events of the last three days were reviewed in German. The papers give little account of the criticisms offered.

OPERATIONS OF SEPTEMBER 15.

This was the Jeûne Fédérale or Thanksgiving Day and divine service was held by the chaplains throughout the army. The foreign officers, as well as the superior officers of the forces in the field and a few of the distinguished civilians of the locality, in all, about seventy-five persons, were invited to lunch at the Hôtel de la Couronne Soleure by the chief of the military department.

At 5 p. m. the foreign officers returned to Bern, from which point they followed the maneuvers of the corps against the combined division.

OPERATIONS OF SEPTEMBER 16.

The supposition upon which were based the operations for the next two days was that a Red army had retired to Bern on September 15 before superior hostile forces and occupied a position from Wohley to Rehag and Könitz to the Gurten to the south and west of Bern.

The vanguard of the second (Red) army corps which was advancing on Bern to the assistance of this supposed army reached the Emme near Kirchberg and Burgdorf on the evening of September 15.

On this same evening a White army was holding the right bank of the Saane and the Sense between Thörishaus and Mühleberg. One division (the combined division) crossed the Aar near Liss and pushed its vanguard to Seedorf and Gross Affoltern.

At the close of the maneuvers of division against division on the 14th, the troops of the second army corps were distributed as follows:

Corps headquarters—Kirchberg.
  Tenth company of guides—Kirchberg.
  Telegraph company—Kirchberg.
Third division headquarters—Ersigen.
  Troops—Kirchberg, Ersigen, Niederösch and Oberösch.
Fifth division headquarters—Burgdorf.
  Troops—Burgdorf and Winigen and the villages and homesteads lying between them. Rumendingen, Alchenstorf and Bütigkofen and the villages between them, with the twentieth infantry occupying Aeflingen, Rüdligen, and Widenhöfe.
Cavalry brigade headquarters—Lissach.
  Troops—Lissach, Alchenflüh and Im Holz.
Tenth field artillery regiment headquarters—Koppigen.
  Troops—Koppigen, Oeschberg and St. Niklaus.
Pontoon company—Höchstetten.
Corps commissariat—Herzogenbuchsee.

The following orders were issued by the commander of the Red army and the commander of the second army corps for September 16:

RED ARMY HEADQUARTERS,
Bern, September 15, 1901, 5 p. m.

TO THE COMMANDER OF THE SECOND ARMY CORPS:

1. The hostile army occupies the right banks of the Saane and Sense between Thörishaus and Mühleberg. A hostile division has crossed the Aar near Liss.

2. Our army will await the enemy on the line Riederen-Rehag-Köritz.

3. You are hereby ordered to engage the hostile division, which has crossed the Aar near Liss, to-morrow, September 16, and if possible to drive it back across the river.

THE COMMANDER OF THE RED ARMY.

Directions for the maneuvers.

1. All the troops of the second army corps, with the exception of the cavalry, must be on the right bank of the Emme on September 16 at 6.30 a. m.

2. The cavalry of the second army corps must not cross the line Büren zum Hof, Fraubrunnen, Kernenried, Mötschwil before 6 a. m. The heads of the infantry columns must not cross the Emme before 7.15 a. m.

3. The hostile troops will wear a white band around their helmets.

Corps Order No. 2 (Red).

KOPPIGEN, *September 15, 6 p. m.*

1. The White army, before which our Red army retired to the line Wohley-Rehag-Könitz, occupies the right banks of the Saane and the Sense, between Thörishaus and Mühleberg.

A strong hostile division crossed the Aar near Liss, and pushed its outposts forward to the line Seedorf-Gross Affoltern.

2. Our army corps must march against this hostile division to-morrow, in the order indicated hereafter, and try to drive it back across the Aar.

3. The second cavalry brigade will be in a covered position at the west issue of the forest near "Im Holz," at 5.45 a. m. At 5.55 a. m. it will advance in the direction of Ifwil, and from there cover the advance of the army corps toward the plateau near by. Further, it will reconnoiter for the whereabouts of the reported hostile division in the direction of the Aar, from Wohlen to Frieswyl on the one hand and toward Büren on the other.

4. The right column will advance from Aeflingen via Fraubrunnen, Grafenried (the part of the main road between Fraubrunnen and Grafenried will be left free), Ezelkofen, Brunnenthal, Bittwil toward Zimlisberg; head of the infantry to pass point 498 (west of Aeflingen) at 7.30 a. m.

The middle column will advance from Kirchberg via Zauggenried, Fraubrunnen, Grafenried, Ifwil, Oberschünen toward Rapperswil. The head of the infantry will pass the bridge of the Emme at 7.15 a. m.

The left column will advance from Burgdorf via Mötschwil, Hindelbank, Münchringen, Jegenstorf, Zuswil, Bangerten toward Dieterswil. The head of the infantry will pass the railway crossing near Steinhof at 7.35 a. m.

Each column must cover its own assembly and secure its advance.

5. The pontoon division and the telegraph company will receive their orders direct from the chief of engineers.

6. The provision and baggage columns of the third division and the corps troops will be on the road Oeschberg-Kirchberg at 11 a. m., head of the column at the north entrance of Kirchberg; those of the fifth division at 11 a. m. at Steinhof.

7. Orders will be issued to three column commanders at 6.45 a. m. at the south issue of Alchenflüh.

Order of Troops.

Independent cavalry:
  Second cavalry brigade and second Maxim-gun company.
Right column:
  Twentieth infantry, one section of dragoons, seventeenth and eighteenth batteries, one company of sappers.
Middle column:
  Third division, with the fifty-first and fifty-second batteries.
Left column:
  Fifth division, minus the twentieth infantry, twenty-ninth and thirtieth batteries.

The Commander of the Second Army Corps:
(Signed) **Fahrländer.**

Composition of the Second Army Corps.

Commander: Colonel Fahrländer.
Staff.
Tenth company of guides (headquarters)
One company of cyclists (headquarters).
Corps troops:
  Second cavalry brigade (Colonel Gugelmann)—
    Third dragoons (3 squadrons).
    Fifth dragoons (3 squadrons).
    Second Maxim-gun company.
  Corps artillery (Colonel Rosenmund)—
    Tenth field artillery regiment—
      First battalion (3 batteries).
      Second battalion (3 batteries).
  Pontoon division (first and second pontoon companies).
  Pontoon train.
  Second telegraph company.
  Corps commissariat establishment (third and fifth commissariat companies).
  Corps commissariat train.
  Third division (Colonel Bühlmann).
    Staff.
    One section of cyclists (headquarters).
    Fifth infantry brigade (Colonel Will)—
      Ninth infantry (3 battalions).
      Tenth infantry (3 battalions).
    Sixth infantry brigade (Colonel Wattenwyl)—
      Eleventh infantry (3 battalions).
      Twelfth infantry (3 battalions).
    Third company of guides (special cavalry).
    Divisional artillery—
      Third field artillery regiment—
        First battalion (3 batteries).
        Second battalion (3 batteries).
    Third engineer half-battalion (first and second sapper companies).
    Third division field hospital (ambulances 11, 12, 13).
    Third division hospital train.

Fifth division (Colonel Scherz)—
  Staff.
  One section of cyclists (headquarters).
  Ninth infantry brigade (Colonel Iselin)—
    Seventeenth infantry (3 battalions).
    Eighteenth infantry (3 battalions).
  Tenth infantry brigade (Colonel Bertschinger)—
    Nineteenth infantry (3 battalions).
    Twentieth infantry (3 battalions).
  Fifth company of guides (special cavalry).
  Divisional artillery—
    Fifth field artillery regiment—
      First battalion (2 batteries).
      Second battalion (2 batteries).
  Fifth engineer half-battalion (first and second sapper companies).
  Fifth division field hospital (ambulances 21, 22, 23).
  Fifth division hospital train.

Composition of the Maneuver Division.

Commander: Colonel Audéoud.
Staff.
First company of guides (headquarters).
One section of cyclists (headquarters).
First infantry brigade (Colonel Köchlin):
  Second infantry (3 battalions).
  First infantry (3 battalions).
Fourth infantry brigade (Colonel Courvoisier):
  Seventh infantry (3 battalions).
  Eighth infantry (3 battalions).
Combined brigade of guides (special cavalry) (Lieutenant Colonel Hägler):
  First guides (3 companies).
  Second guides (3 companies).
First Maxim-gun company.
Ninth field artillery regiment:
  First battalion (3 batteries).
  Second battalion (3 batteries).
First engineer half-battalion (first and second sapper companies).
One ambulance of the first army corps field hospital.

The supposed White army, having driven the supposed Red army to the neighborhood of Bern, proposed to advance against it on the 16th and renew the attack before reenforcements (second corps) arrived. To accomplish this the maneuver division was pushed forward from Liss and Aarberg and directed to engage the second corps and prevent this junction.

The line of supposed outposts Bütschwil, Schüpfen, Wierezwil, Wengi must not be crossed before 5.30 a. m. by the cavalry nor before 6 a. m. by the infantry.

The troops of the maneuver division can be recognized by white bands around their helmets.

Colonel Audéoud issued the following order for the movement:

Order of assembly for September 15.

LISS, *September 15, 1901, 7 p. m.*

MANEUVER (WHITE) DIVISION.

1. The main body of the hostile army has established itself to the west of Bern. A hostile army corps marching toward Bern reached Kirchberg and Burgdorf to-day.

2. Our army will march on Bern to-morrow morning. I have received orders to try to prevent the hostile corps from joining its army. I shall therefore march toward Jegenstorf to-morrow morning.

3. I therefore direct:

(*a*) The brigade of guides, reenforced by the first Maxim-gun company, to cross the road Frauchwil–Wierezwil to-morrow at 5.30 a. m. and to advance to the heights of Jegenstorf. From there they will cover the advance of the division and reconnoiter in the direction of Fraubrunnen and Kirchberg, Lissach, Hindelbank, Schönbühl.

Three officers' patrols will leave at the same time for Bern (supposed), Kirchberg, and Burgdorf.

(*b*) The other troops will be ready to march as follows: Seventh infantry, one platoon of the first company of guides, one company of sappers, and the balloon company, at 5.45 a. m. south of the stream of Frauchwil and west of the road Frauchwil–Wierezwil; eighth infantry, two platoons of the first company of guides and one company of sappers, at 5.45 a. m. south of the road Gross Affoltern–Frauchwil, head of the column at the corner of the forest (point 517); ninth field artillery regiment at 6 a. m. on the road Gross Affoltern–Frauchwil, head of the column at the corner of the forest (point 517); first infantry brigade at 6.15 a. m. south of the road Gross Affoltern–Frauchwil, directly to the east of Gross Affoltern; the ammunition train of the division at 6.30 a. m. by the roadside south of Gross Affoltern.

4. The baggage and provision wagons will assemble at 7 a. m. to the west of Liss. The baggage wagons of the organizations camping on or to the north of the Liss–Schüpfen road will not leave their cantonments until after 6.30 a. m. Ambulance 9 will remain at Liss as a sick depot.

5. Orders will be issued at 5.40 a. m. 1,500 meters east of Gross Affoltern (point 517). I will go from Liss via Suberg at 4.45 a. m.

The Commander of the Maneuver Division:

(Signed) AUDÉOUD.

The following table shows the relative strength of the two opposing forces in the different arms.

	Second army corps.	Maneuver division.
Infantry	26 battalions	12 battalions.
Field artillery	14 batteries	6 batteries.
Cavalry	8 squadrons	7 squadrons.
Engineers	4 companies	2 companies.

The balloon was attached to the maneuver division.

Colonel Audéoud started his division promptly and by a rapid march occupied the heights of Jegenstorf before 8 a. m. He placed the fourth brigade in this advanced position, which was put in a condition of defense by the construction of shelter trenches, etc. The streets of the town were also barricaded. The first brigade was placed in reserve near Ifwil. He thus placed himself so near the line of march of the Red army corps that his presence could not be ignored and in a position strong against attack from the east, with his line of retreat secured by one brigade at Ifwil if attacked from the north. The Red troops were nowhere in sight, but little time elapsed before the fifth division appeared in the distance. Soon after, the observer in the balloon reported a force with artillery (third division) advancing from the north, which threatened the line of retreat. About 9 a. m. the batteries near Jegenstorf fired a few shots and then the withdrawal of the brigade to a position near Ifwil was begun. This position was a strong one. The artillery was on hill 609 of the map; one regiment of infantry to the right of the artillery position with one regiment in reserve west of Zuzwil; on the left two battalions in line with four in reserve. The engineers were sent to the rear to strengthen a position near Dieterswil, to which the division could fall back, as soon as it was pressed by the Red army corps. About 10 o'clock a report was received from the balloon that a column of infantry with artillery was advancing from Ezelkofen. This was the right column of the Red army corps. About 11 a. m. two of its battalions debouched near Messen–Schünen and struck the reserve of the left brigade. This, on account of its superior force, successfully repelled the attack. While this was going on the Red cavalry brought its Maxim guns into action under cover of the woods at the edge of the forest to the east of Zuzwil. The third and the fifth divisions had moved up under cover of the woods ready for a simultaneous assault, but without waiting for this Colonel Audéoud had begun his retreat to the next position. Just as the last of the infantry was entering the edge of the woods the Red cavalry made a charge from Zuzwil. The charge was made up hill in soft ground in column of platoons, pretty to see but doomed to failure. Before the Red infantry could attack, the White infantry had disappeared in the woods. They retreated to Dieterswil, closely pursued by the Red troops. Indeed the pursuit was pushed so hard that many of the White division must have been captured in the woods south of Hohrain, where the infantry of both armies was mingled.

The position at Dieterswil was not held long, for about this time Colonel Künzli, director of maneuvers, directed Colonel Audéoud to continue his retreat to Schüpfen without unnecessary delay. At the same time the Red troops were forbidden to pass the Lyssbach, a small stream that flows westward from Schüpfen. It was now 2 p. m. and the maneuvers were suspended for the day. The maneuver division devoted the remaining portion of the day to fortifying the positions to the south of Lyssbach.

Announcement was made that the White army (indicated) had failed in its attack upon Bern and had been forced to retire behind the Saane and the Sense. Colonel Audéoud announced in the orders that he would hold the heights between Schwanden and Bundkofen during the night.

Colonel Fahrländer issued an order at 2.15 p. m. announcing the cessation of the conflict for the day and directing the cavalry brigade and division commanders to locate the position of the enemy and to report to him the result of their reconnaissance. At 6 p. m. he issued corps order No. 4 announcing that the enemy still held Schüpfen, Ziegelried, Bühlhof, and Wiler im Sand, and that he would attack the heights of Seedorf the next day. The fifth division from Wierezwil would pass between Schüpfen and Brandkofen to operate against the heights of Ziegelried; the third division from Ammerzwil against Wiler im Sand and Seedorf; the attack to be made in several columns on a wide front; the infantry to cross the railway line at 7 a. m.; the corps artillery in Gross Affoltern to be ready at 6.30 a. m. to take position in Sonnenrain; the roads to be reconnoitered; the cavalry brigade on the left to advance on Frienisberg via Schüpfen, crossing the road Schüpfen–Schönbühl at 6 a. m.

During the afternoon it was reported that the Red troops were strengthening their right, massing on the left flank of the White division. This was soon confirmed by the cavalry. Colonel Audéoud then moved the main body of his division to the rear and to the left.

It had rained hard early in the morning, but after 9 a. m. the day was beautiful and much more energy was displayed than on any of the previous days of the maneuvers.

OPERATIONS OF SEPTEMBER 17.

The early morning found the maneuver (White) division as follows: One regiment at Schüpfen, two batteries in position on the hill east of Bürglen and the other four batteries with the first infantry brigade near Bundkofen; one regiment of infantry in reserve in rear of the left.

About 7 a. m. the Red infantry made its appearance from Wierezwil, moving in the direction of Sonnenrain. Seven batteries soon came into position at Sonnenrain and Bühlhof near the edge of the woods. This last position was within 1,200 meters of the four batteries of the White artillery already in position at Ziegelried and within 700 meters of the first line of the White infantry, there formed in three lines, one above the other. About this time the movement of the third division from Ammerswil was reported from the balloon. This decided Colonel Audéoud to withdraw the seventh infantry and the two batteries from Bürglen to Ziegelried and from there to withdraw the whole force to Wiler im Sand. The eighth infantry, then in reserve, was sent at once to reenforce a battalion already at Wiler im Sand. The cavalry was sent to cover the left wing in the shelter of the woods at Rotholz.

The fifth division attacked in three columns. Six battalions marched by Sonnenrain directly on Ziegelried, four battalions by Schüpfen, four battalions from Seewil passed by the left to take position in rear. At 7.30 a. m. the position of the maneuver division seemed critical. The attack of the fifth division was made with great energy in hope of delaying the withdrawal of the White troops until the third division could get in their rear, but Colonel Audéoud succeeded in withdrawing his troops from Ziegelried in time, and by rapid marching he placed two batteries at Rotholz; four others on the hill north of Grissenberg, where they had an uninterrupted field of fire on the troops of the third division, taking them in the flank with no artillery to oppose them. The seventh (White) infantry was along the edge of the woods near Rotholz. Two battalions acting as rear guard held the fifth division in check, while the rest of the infantry reached Grissenberg out of sight of the third division. The third division was now advancing up the valley toward Wiler im Sand and Rotholz, making a desperate attempt to cut off the retreat of the maneuver division from the bridge over the

Aar at Aarberg. About 9 a. m. the situation was desperate, the fifth division was approaching and the third division was still advancing, although under a galling fire of infantry and artillery on Wiler im Sand. Colonel Audéoud then ordered an attack along the whole line. The infantry in Grissenberg, hitherto unseen, advanced in fine order to the charge. This was soon followed by a charge of cavalry on the left. The artillery still played upon the supports and reserves of the attacking forces. The Red artillery belonging to the third division appeared at 9.04 a. m. at the edge of the wood west of Seedorf, but it was too late. The fifth division was out of reach behind hill 558, still advancing, but held in check by the rear guard of the White division. The cavalry brigade had gotten around to Frienisberg, but found its way blocked by a detachment of infantry guarding the extreme flank. At 9.08 a. m. Colonel Künzli, director of maneuvers, ordered the halt sounded, but the excitement of the men made it hard to obey. The cavalry rode on, and the infantry, now in actual contact, were ready to club each other with their guns. The cavalry brigade was in close proximity to the balloon at the close, but the commander hesitated to destroy the telephone wires, which he could not repair. They were therefore left undisturbed.

The critique was held near Grissenberg. The operations of the troops were praised by Colonel Künzli and the chief of the military department, Colonel Müller. The latter referred to the trying weather during the maneuvers and seemed well pleased with the endurance and discipline exhibited by the troops under such circumstances. It was conceded that the counter-attack of the maneuver division had succeeded and that it could safely retire across the Aarberg bridge. At the same time the dispositions of Colonel Fahrländer received much favorable mention, for it looked as though he would succeed, until a few minutes before the end, when it became apparent that almost the entire maneuver division could take the third division at a great disadvantage before the fifth division could arrive.

OPERATIONS OF SEPTEMBER 18.

Owing to the continued rains and the soft condition of the ground the review and inspections scheduled for this day were abandoned. The troops were assembled at their camps and discharged on the 19th without confusion.

REMARKS.

During the operations of the first three days the weather was so bad that during the first much less spirit was shown than during the latter period by the same troops. On the 12th and 13th horses were seen mired in the fields and wheeled vehicles would stick almost anywhere off the roads. The men had no opportunity to dry their clothing, yet there seems to have been no abnormal sick report. The only death I have seen reported was that of a man run over during the final action at Wiler im Sand.

The perambulating kitchens supplied to the cavalry, artillery, and engineers played an important part during the earlier operations by having warm soup always ready for the men, when it could be served to them. These were of two kinds. Some were two-wheeled carts with a fire-box under the axle and two boilers whose covers were fastened on securely, with a small mess-chest on the front. The others were four-wheeled; the limber carried the mess-chest and there was a small chest on the carriage in front of the caldrons.

AUTOMOBILES.

The Government has begun some experiments with automobiles, and this year hired five for trial from September 4 to 20. These were assigned by the corps commander, one passenger car to each corps and division headquarters, one freight car capable of carrying 1,000 kilograms (2,200 pounds) to the third rifle battalion, one freight car capable of carrying 2,000 kilograms (4,400 pounds) to the corps commissariat. As far as I have been able to learn the results have been quite satisfactory. On the roads, generally good and not very steep, they were excellent, and went very well off the roads where they did not sink deep enough to drag the gearing. The staff officers liked them and those for freight did excellent work during the entire period.

BALLOON.

A balloon was employed for the first time in the maneuvers in Switzerland. It was of the "cerf volant" or kite type; its cable was wound around a drum operated by steam and carried on a special carriage constructed for the purpose; its car accommodated two officers and was connected with the ground by telephone. It was inflated with seven tubes of hydrogen compressed at 150 atmospheres, which served for the entire period, although the transportation of the balloon was more difficult than it would have been to discharge the gas and refill it when needed, but it was less expensive. During the division maneuvers the rain, clouds, and fog made it difficult to see far, but the service rendered by the balloon was appreciated. Colonel Audéoud at the critique gave great credit to the balloon for furnishing him quickly with exact information of the enemy's movements. During the last two days its service was of the greatest importance to the operations of the maneuver division. About 70 men were on duty with the balloon detachment.

CAVALRY.

It was apparent that the cavalry lacked enterprise, even during the first day's operations in the maneuvers of division against division. It was timid in reconnaissance work and stuck too close to the infantry. Although armed with good carbines it seldom dismounted to fight on foot, rather adhering to the idea that its chief functions in battle were shock action. Even with the aid of its Maxim guns it was seldom seen in action with the infantry, except when mounted, when its spectacular charges were more theatrical than useful. The Maxim guns are carried on horses, one horse carrying the gun, another the carriage and ammunition. There are four of these Maxim-gun companies in the Swiss service, one attached to each cavalry brigade.

ARTILLERY.

The artillery of the corps seemed in very good condition. At times it was a little sluggish, while at other times it was reckless, coming into action under infantry fire at close range and continuing under fire until it would have been disabled in actual warfare. The guns are all of Krupp manufacture, 8.4-centimeter caliber, of dates from 1882 to 1895. The carriages were made at the Government shops in Switzerland and are of good quality.

INFANTRY.

The infantry displayed much the same characteristics under more unfavorable circumstances as did the third corps last year. The marching was good and the coordinate elements worked in harmony. Only once did there appear to be any confusion and then the superior officers and their staffs were at the critique, and the hard rain made the troops overanxious to get to their cantonments. Under fire there was no apparent effort on the part of the men to entrench themselves or to utilize the undulations of the ground to shield themselves from the effects of hostile fire.

Attacks were made by successive lines of battle moving forward with few halts. No effort was made to advance by rushes. The first line, which is usually less dense than the succeeding lines, halts to fire. It habitually fires kneeling. The second line gains on the first and charges with it. They generally move in quick time, often wholly indifferent to the close-range fire of artillery, which with shrapnel would annihilate them. The men carried all the cartridges required for action. No illustrations were given of supplying ammunition to the firing line, although the infantry is supplied with steel-covered ammunition wagons intended for that purpose.

Whenever the troops were seen on the march, they were well closed up, although the step was nearly 120 to the minute. They carry their arms slung on the right shoulder and march with a good deal of swing. During the route marches the men smoked and talked, but always kept their places.

The new shelter tent is wrapped around the overcoat in a long roll that extends across the top and down the sides of the knapsack, where it is secured by straps. It has a very neat appearance.

From motives of economy only the first ten classes of the élite were called out this year, so that all the men in the ranks were under 30 years of age.

XIII.—BIBLIOGRAPHY.

INDEX OF SPECIAL MILITARY SUBJECTS TREATED IN VARIOUS BOOKS, PAMPHLETS, AND PERIODICALS RECEIVED IN THE MILITARY INFORMATION DIVISION DURING 1901.

ABBREVIATIONS OF PERIODICALS.

AE	Arms and Explosives.
AT	Artilleri-Tidskrift.
E	Engineer.
Eg	Engineering.
IMT	Indisch Militair Tijdschrift.
IR	Internationale Revue.
IR Beih.	Internationale Revue, Beiheft.
IR Sup.	Internationale Revue, Supplément.
JDAM	Jahrbücher für die deutsche Armee und Marine.
JRUSI	Journal Royal United Service Institution.
JSM	Journal des Sciences militaires.
JUSII	Journal of the United Service Institution of India
KZ	Kriegstechnische Zeitschrift.
MA	Memorial de Artillería.
MS	De Militaire Spectator.
MW	Militär-Wochenblatt.
MGAGW	Mittheilungen über Gegenstände des Ingenieur und Geniewesens.
NAT	Norsk Artilleri Tidsskrift.
NMB	Neue Militärische Blätter.
OMWV	Organ der militär-wissenschaftlichen Vereine.
PRAI	Proceedings of the Royal Artillery Institution.
RAB	Revue de l'Armée belge.
RA	Revue d'Artillerie.
RC	Revue de Cavallerie.
RCM	Revue du Cercle militaire.
RGM	Revue du Génie militaire.
RI	Revue d'Infanterie.
RMAE	Revue militaire des Armées étrangères.
RMS	Revue militaire suisse.
RMU	Revue militaire universelle.
RSIM	Revue du Service de l'Intendance militaire.

RAG	Rivista di Artiglieria e Genio.
RMI	Rivista militare italiana.
SMB	Schweizerische Militärische Blätter.
SA	Scientific American.
USM	United Service Magazine.

- Acoustic telemeter:
  - Great Britain: Proposed experiments with Giletta's acoustic telemeter. SA., Sept. 28, p. 199.
  - Italy: Giletta's acoustic telemeter. (Note.) RMS., Oct., p. 864.
- Administration:
  - Mexico: Reglamento de administración militar en tiempo de guerra (Regulations for military administration in time of war.) 20 pp Mexico, 1901.
- Aërial navigation (*see* Balloons).
- Aërial torpedoes (*see* Torpedoes).
- Africa:
  - The partition of Africa. (Areas of territories belonging to each nation.) RCM., May 25, p. 556.
  - Africa and colonial expansion. (With map.) RMU., Nov., p. 143.
- Alpine troops:
  - France: Winter maneuvers of Alpine troops in high mountains. MW., Apr. 13, p. 857.
- Alpine warfare:
  - Various: Alpine warfare. RI., Oct., p. 365.
- Aluminum:
  - Various: Aluminum and its special military uses. RAG., Nov., p. 247.
- Ammunition, consumption of:
  - Various: Consumption of ammunition by infantry and effect of rifle fire. NMB., Oct., p. 337; IR., Sup. 37, p. 97 (transl.).
- Ammunition supply:
  - Italy: Allowance of ammunition (ordnance and small-arm). RMAE., May, p. 439.
  - Russia: Experiments with a new method of supplying ammunition to artillery. IR., Oct., p. 436.
- Antwerp:
  - Enlargement of fortress at. IR., June, p. 235.
- Argentina:
  - Division into military districts. MW., July 24, p. 1691.
  - War academy. MW., July 17, p. 1642.
  - Reorganization of war department. MW., July 27, p. 1733.
  - Army reorganization bill. IR., Mar., p. 81; Aug., p. 329.
  - New organization of the normal firing school. IR., Aug., p. 329.
  - Law of universal service liability. IR., Dec., p. 489.
- Armament:
  - Various: *See* Handbooks of various armies under "Organization."
- Armed strength (*see* Organization; Budgets).

- Armor (*see also* Shields):
  - Austria:
    - Die Skoda'schen Panzer, Panzerthürme, Panzerlaffeten, gepanzerte Beobachtungs-, Distanzmesser- und elektrische Scheinwerferstände, Panzerschilde und Panzercasematten für Brustwehren und Flankierungs-Anlagen, Panzerbatterien. (The Skoda armor: Armor turrets, armored gun carriages, armored observation, range finder, and searchlight stands, armored shields and casemates for breastworks and flanking works, and armored batteries.) iv, 60 pp. Pilsen, 1900.
    - ——— The same. Album of plates. 65 pl. Pilsen, 1900.
  - Great Britain:
    - Armor-plate trials. (Ill.) E., Apr. 12, p. 377; Aug. 23, p. 204.
    - Armor-plate tests (Note on). AE., Oct., p. 155.
    - Armstrong-Whitworth armor-plate trials. Eg., Feb. 15, p. 204.
  - Various:
    - Armor plates at the Paris exposition of 1900, (Ill.) RAG., June, p. 378.
    - Armor as at present applied, and its behavior in action. JRUSI., Feb., p. 130.
    - Armor plates at the Paris exhibition. (Ill.) Eg., Jan. 18, p. 66.
- Armored trains:
  - Great Britain: Some notes on guns on railway mountings. JUSII., Oct., p. 318.
- Armor-piercing projectiles:
  - Great Britain: Capped armor-piercing projectiles. (Ill.) Eg., June 14, p. 785; July 26, p. 128.
  - Various: Capped projectiles. IR., May, p. 227.
- Artillery:
  - Belgium: Our artillery and the mixed military commission of 1901. RAB., July–Aug., p. 45.
  - France: Organization of the artillery of infantry divisions in peace time. RCM., Aug. 3, p. 151.
  - Russia: Number of batteries kept constantly on a war footing in European Russia. IR., Jan., p. 29.
  - Spain: Manuel del oficial de artillería. (Manual of the artillery officer.) By Fernando de la Torre y de Miquel, artillery officer. viii, 312 pp. Barcelona (no date).
  - Various: The evolution of artillery in the nineteenth century. RAG., June, p. 287.
- Ashanti war:
  - Ashanti campaign, 1900: Its origin and how it was carried through. USM., May, p. 135.
  - Correspondence relating to the Ashanti war, 1900. x, 116 pp. London, 1901.
- Aubry:
  - France: Description and pls. of Aubry range finder. RA., Sept., p. 437; Dec., p. 181.
- Australia:
  - The Australian soldier. (Lecture.) JRUSI., Oct., p. 1163.
  - The yearbook of Australia for 1901. 840 pp. London (no date).

- Automatic guns:
  - France:
    - 47-mm. semiautomatic Hotchkiss gun. (Ill.) Eg., Mar. 22, p. 361.
    - The Hotchkiss 37-mm. automatic gun. (Ill.) Eg., Mar. 15, p. 328.
  - Germany:
    - The Maxim 3.7-cm. automatic gun at the German maneuvers of 1901. JDAM., Nov., p. 224.
    - The machine and automatic guns of the gunboat *Iltis*. (Ill.) MW., June 5, p. 1315.
  - Great Britain:
    - The Vickers-Maxim automatic guns. (Ill.) RA., Feb., p. 369.
    - The pompoms in the Transvaal war. NMB., Jan. 1, p. 27; IR., Sup. 24.
    - An English professional opinion on automatic guns (pompoms). MW., Jan. 9, p. 66; Feb. 27, p. 479.
    - Organization of the pompom. PRAI., Sept.-Oct., p. 291; the pompom, p. 295; the future of pompoms, p. 299.
    - Heavy types of automatic guns. (Note.) Eg., Mar. 8, p. 301.
- Automatic loading system, a new, for rifles. KZ., No. 3, p. 105.
- Automatic pistols (*see* Pistols).
- Automatic rifles (*see* Rifles).
- Automatic sights (*see* Sighting devices).
- Automobiles:
  - Austria:
    - Automobiles purchased for military purposes. IR., May, p. 213.
    - Military transport wagon for Austrian army. JRUSI., Aug., p. 1016.
  - Belgium: Automobiles in the Belgian army. RAG., Jan., p. 129.
  - France:
    - Automobiles in the army. IR., May, p. 196.
    - Twelve automobiles purchased for the war school. IR., July, p. 284.
    - An automobile forage wagon. (Ill.) SA., Oct. 12, p. 229.
  - Germany:
    - Automobiles at the maneuvers of 1901. JDAM., Nov., p. 225.
    - Automobiles ordered for communication troops. RCM., June 22, p. 664.
    - Automobiles and traction engines at the imperial maneuvers. MW., Oct. 9., p. 2329.
    - Employment of motor vehicles for military purposes. (Ill.) MW., Nov. 20, p. 2697.
  - Great Britain:
    - Fowler traction engines. (Short note.) MGAGW., No. 9, p. 639.
    - Automobile freight wagons in England. MW., Sept. 8, p. 2063.
    - Prize contest for self-propelled lorry for military purposes. E., May 17, p. 514.
    - Marconi's wireless-telegraphy automobile for military purposes. (Ill.) SA., July 20, p. 40.
    - Awards of judges at Liverpool motor-wagon trials. Eg., Aug. 16, p. 225.
    - Tractors for military purposes. (Requirements for prize contest.) Eg., Nov. 1, p. 623.

Automobiles—Continued.

Great Britain—Continued.

The Liverpool heavy motor-car trials. (Ill.) E., May 31, pp. 574–5; E., June 7, p. 592; Eg., May 31, p. 699 (ill.); Eg., June 7, p. 729 (ill.), p. 775.

Motor lorries for military purposes. E., Dec. 6, p. 582; Dec. 13, p. 601 (ill.).

War office motor-wagon trials. (Ill.) E., Dec. 13, p. 604.

A motor field battery. PRAI, Jan., p. 509.

Engine traction for artillery. PRAI., Feb., p. 589.

Italy:

Competition to secure military automobiles. IR., Oct., p. 426.

Mechanical traction; use of automobiles in army. JDAM., Nov., p. 242–3.

Russia: Note on trial of automobiles for transport of military stores. IR., Sept., p. 402.

Various:

Motor carriages for military purposes. OMWV., Vol. LXII, p. 217.

Modern traction engines for transporting military stores; their use in the South African war. (Ill.) OMWV., Vol. LXII, p. 409.

Automobiles and traction engines in war and peace. SMB., Nov., p. 452.

Employment of traction engines and armored trains in the field. RAG., May, p. 243.

Mechanical traction on highways and its use in war. By Layriz. (Ill.) KZ., No. 5, p. 256.

Traction engines in army service. (Ill.) KZ., No. 10, p. 531.

The automobile and its possible use for military purposes. (Ill.) PRAI, May–June, p. 53.

Automobiles in the European armies. IR., July, p. 323.

Automobilism from a military standpoint. RCM., Nov. 16, p. 529.

Les progrès de l'automobilisme militaire. (The progress of the use of military automobiles.) By Lieut. Col. H. R. 14 pp. Paris (no date).

Mechanical traction in war for road transport, with notes on automobiles generally. By Lieut. Col. Otfried Layriz, of the German army. Translated by R. B. Marston. xii, 102 pp.; illustrated. London, 1900.

Horseless vehicles, automobiles, motor cycles, operated by steam, hydrocarbon, electric, and pneumatic motors. By Gardner D. Hiscox, M. E. 459 pp., 316 figs. London, 1900.

Bake ovens:

Austria: Experiments with a new model of field oven. RSIM., Jan., p. 90.

Russia: Field bake ovens in Russia. KZ., No. 3, p. 141.

Bakeries:

France: Matériel de la boulangerie militaire et appareils du service de santé destinés aux troupes en campagne. (Military baking outfit and medical apparatus for troops in the field.) 19 pp., 15 pl. Paris (Société Industrielle de Creil).

Balearic Islands:
- The defensive organization of. RCM., Oct. 12, p. 390.

Balkan States (*see also* Bulgaria, Roumania, Servia, etc.):
- Handbook of the armies of the Balkan States. 1900. Prepared in the intelligence division, war office, by Capt. M. C. P. Ward, R. A., staff captain. 107 pp., 1 map. London, 1900.

Ballistics:
- Experimental tests on the expansion of powder gases in guns. MGAGW., No. 2, p. 121.
- New methods for determining the initial velocity of small-arm projectiles in the vicinity of the muzzle. MGAGW., No. 4, p. 269.
- The influence of the earth's rotation on the movement of projectiles. MGAGW., No. 10, p. 707.
- Resistance of air at velocities under 1,000 feet per second. MGAGW., No. 10, p. 735.
- The application of the theory of probabilities to the combat fire of infantry by battalions. KZ., No. 3, p. 119.
- New methods of calculating the course of gas-pressure curves in cannon. KZ., No. 6, p. 292.
- Once more the influence of meteorological conditions on the trajectory of rifle bullets. KZ., No. 6, p. 327.
- The vertical extent of the cone of fire. KZ., No. 6, p. 330.
- New formulas for calculating gas pressure and velocities of projectiles in barrels of firearms. KZ., No. 10, p. 525.
- The action of explosives in arms according to Colonel Mata. RAG., Jan., p. 5.
- The minimum velocity. RAG., Mar., p. 287.
- Some new forms of resistance which reduce the ballistic problem to quadratures. RAG., July–Aug., p. 5.
- Note on corrections in trajectory in seacoast fire. RAG., Oct., p. 59.
- On the problem of interior ballistics. MA., Mar., p. 251.
- Compilation of range tables. PRAI., July–Aug., p. 149.
- Artillery Circular N. Handbook of problems in exterior ballistics. By Lieut. Col. James M. Ingalls, 3d Artillery, U. S. Army, under the direction of the Secretary of War. 3d edition. Adjutant General's Office, 1900. v, 250 pp. Washington, 1900.

Balloons:
- Austria: Organization, etc., of the balloon troops. RGM., May, p. 456.
- France: Training of military balloonists in France. KZ., No. 9, p. 500.
- Germany: Composition of balloon battalion. RCM., Apr. 20, p. 434.
- Great Britain: The balloon sections in South Africa. RCM., Aug. 3, p. 153.
- Italy: Purchase of a kite balloon for army. IR., Oct., p. 425.
- Japan: Note on military ballooning. IR., Apr., p. 150; RCM., Apr. 20, p. 436.
- Russia:
  - Military ballooning in Russia. KZ., No. 4, p. 177.
  - Training of officers of the instructional balloon park. IR., Aug., p. 355; Nov., p. 480.

Balloons—Continued.
  Switzerland: Composition of balloon company. MW., May 29, p. 1280; SMB., May, p. 230.
  Various:
    The captive balloon in field warfare. OMWV., Vol. LXII, p. 237.
    The development of military ballooning. OMWV., Vol. LXIII, p. 59.
    Military ballooning. (Historical study.) RMI., June, p. 1055.
    The development of aërial navigation, from a military standpoint. IR., Sup. 22, Jan., p. 580.
    The military value of the captive balloon. IR., Sup. 32, p. 929.
    Aërial navigation. (Ill.) MS., Jan., p. 8.
    L'aérostation et ses applications militaires. (Aerostation and its military applications.) By Jacques Courty. 48 pp. Paris (no date).
Balloons, firing at. (*See* Firing at balloons.)
Bandolier:
  Great Britain: A new bandolier and cartridge holder. (Ill.) AE., Nov., p. 178.
Barr & Stroud's range finder:
  Great Britain: Barr & Stroud's range finder for field artillery (in Boer war). NAT., No. 1, p. 39.
Battery construction:
  Germany: Note on recent German regulations for. JRUSI., Sept., p. 1144.
Bayonet exercise (*see* Fencing).
Benedetti:
  Italy: Bullet-proof shield invented by. RMS., Sept., p. 734.
Bergmann:
  Germany:
    The Bergmann machine gun, model 1901. (Ill.) KZ., No. 10, p. 555.
    Bergmann's Rückstosslader. (Bergmann's automatic pistols.) By Dr. Reinhold Günther, captain in the Federal rifle battalion. 93 pp., 3 pl. Berlin, 1900.
Bicycles:
  Belgium: Trial of a new folding bicycle. IR., Apr., p. 132.
  France:
    The French military folding bicycle. (Ill.) SA., Oct. 26, p. 264.
    Military cyclist sections in France. KZ., No. 8, p. 419; JUSII., Oct., p. 348.
    Formation of two cyclist companies. MW., Mar. 20, p. 650.
    Number of bicyclists that could be called upon in case of war. IR., July, p. 285.
  Germany: The bicycle in the army. IR., Sup. 29, p. 848.
  Great Britain:
    The Lord patent armored bicycle. (Ill.) JRUSI., Jan., p. 91; test firing against, JRUSI., Feb., p. 209.
    A cyclist maneuver at Aldershot. SMB., Nov., p. 459; RCM., Aug., p. 225.
    Maneuvers of combatant cyclists. RCM., Apr. 27, p. 452.

Bicycles—Continued.
  Great Britain—Continued.
    Composition of 8 volunteer bicycle companies formed for South Africa. IR., June, p. 246.
    Cyclist drill. 1900. 35 pp. London, 1900.
  Italy: Cyclist companies in the army. IR., Jan., p. 38.
  Japan: Note on use of military bicycles. IR., June, p. 253.
  Netherlands: Voorschrift betreffende het rijwiel en de wielrijdersoefeningen bij de infanterie. (Regulations concerning the bicycle and bicycle drills of infantry.) vi, 80 pp., 1 pl. Breda, 1900.
  Roumania: Regulations for instructions in military cycling. JRUSI., Apr., p. 491.
  Russia: A bicycle and litter combined. (Ill.) MS., Oct., p. 761.
  Spain: Formation of cyclist sections in the army. IR., Jan., p. 36.
  Various:
    The bicycle in field service. KZ., No. 1, p. 21.
    The Dursley-Pedersen military folding bicycle. (Ill.) KZ., No. 5, p. 274.
    The advanced guard and military bicycling. RMI., June, p. 1014.
Biscuit:
  Various: Les pains de munition et les pains de conserve des principales armées. (Ration bread and biscuit of the principal armies.) By A. Balland, chief pharmacist of the army. 14 pp. Paris, 1901.
Blockhouses:
  The blockhouses in South Africa. RCM., Nov. 23, p. 561.
Boats:
  Germany:
    The Rey lance boat. (Ill.) KZ., No. 7, p. 380.
    The lance boats of the German army. (Ill.) SA., July 6, p. 9.
Boer war:
  Studies on the South African war (1899–1900). RMAE., Feb , p. 97.
  The second Boer war, 1899–1900. By John P. Wisser, captain, 7th U. S. Artillery. 270 pp., 23 maps. Kansas City, Mo., 1901.
  With Roberts to the Transvaal: Being the second part of the pictorial history of South Africa and the Transvaal. Edited by Commander Chas. N. Robinson, R. N. 128 pp.; illustrations, maps, etc. London (1900).
  Report of the royal commission appointed to consider and report on the care and treatment of the sick and wounded during the South African campaign. 71 pp. London, 1901.
  The work of the ninth division. By Maj. Gen. Sir H. E. Colville. xi, 247 pp.; maps. London, 1901.
  Notes and reflections on the Boer war. By Maj. Gen. H. M. Bengough, C. B. 76 pp. London, 1900.
  Meine Erlebnisse und Erfahrungen im Boerenkriege. (My experiences in the Boer war.) By Adalbert Graf Sternberg. 165 pp. Berlin, 1901.
  Der Befreiungskampf der Buren, 1900–1901. (The Boers' fight for freedom, 1900–1901.) By First Lieut. Alfred von Müller. (A continuation of "Der Krieg in Süd-Afrika, 1899–1900.") 54 pp. Berlin, 1901.

Boer war—Continued.

- Reports, etc., on the working of the refugee camps in the Transvaal, Orange River Colony, Cape Colony, and Natal. 387 pp. London, 1901.
- Reports on military operations in South Africa and China. (Military Information Division Publication No. 33.) 600 pp.; maps, etc. Washington, 1901.
- Der Krieg in Süd-Afrika und seine Vorgeschichte. (The war in South Africa, 1899–1900, and its previous history.) By First Lieut. Alfred v. Müller. 3d, revised edition. 5 parts. Berlin, 1900.
- Dispatches from General Buller. (The London Gazette, Jan. 26, 1900.)
- Further correspondence relating to affairs in South Africa. January, 1900. 253 pp. July, 1900. 193 pp. London.
- The true history of the war: Being the official dispatches from the general commanding in chief the forces in South Africa. London, 1900.
- Proclamations issued by Field Marshal Lord Roberts in South Africa. 23 pp. London, 1900.
- Report of Lieut. Gen. H. E. Colville on the operations of the ninth division at Paardeberg. 10 pp. London, 1901.
- Return of military forces in South Africa, 1899–1901. London, 1901.
- South Africa dispatches (from the commander in chief). London, 1900–1901.
- Correspondence between Field Marshal Lord Roberts and Commandant General Botha, June, 1900. London, 1901.
- Return of number of sailors and soldiers who have been invalided home since the commencement of the South African campaign, and have died from wounds or disease. 11 pp. London, 1901.
- Report from Brigadier General Dixon on the operations at Vlakfontein, May 29, 1901. 4 pp. London, 1901.
- Return of the buildings burnt in each month from June, 1900, to January, 1901, including farm buildings, mills, cottages, and hovels. 19 pp. London, 1901.
- Return of the number of persons in the concentration camps in South Africa, June, 1901. London, 1901.
- Copies of dispatches in regard to the naval brigade in South Africa, which were published in the London Gazette of the 12th instant. 58 pp. London, 1901.

Braccialini range finder. KZ., No. 7, p. 367.

Brazil:

- Military budget, effectives, etc., for 1901. MW., July 24, p. 1692.
- Inauguration of Fort Imbuhy at Rio Janeiro. RAG., Nov., p. 323.

Breech mechanisms (artillery):

- France: Description of Darmancier and Dalzon breech mechanisms. RA., June, p 186.

Bridges:

- France: Construction of a trestle bridge by the fourth engineer regiment. RGM., Aug., p. 131.
- Germany: Behelfsbrücken-Vorschrift. (Regulations for the construction of emergency bridges.) 68, 20 pp. Berlin, 1899.

Bridges—Continued.

- Great Britain: Quick construction of railroad bridges in Transvaal war. (Ill.) KZ., No. 3, p. 138.
- Italy: The metallic bridge of the advanced guard. (With plates.) RAG., July-Aug., p. 222.
- Russia: A transportable bridge for field railroads. (Essay.) MGAGW., No. 9, p. 619.
- Switzerland: Throwing an extemporaneous bridge across the Aar at Brugg. (Ill.) RMS., Sept., p. 692.
- Various: Bridge trains and construction of bridges by an army corps since the introduction of heavy artillery into the field army. JDAM., Nov., p. 177.

Browning:

- The Browning automatic repeating pistol. (Description, ballistic data, plates.) KZ., No. 6, p. 281; note on modified Browning automatic pistol (Belgium): AE., Nov., p. 172.

Budgets:

- Austria:
    - Military budget for 1901. IR., Apr., p. 153; for 1902: RCM., Nov. 2, p. 489.
    - Beilagen zum Voranschlage über die gemeinsamen Ausgaben und Einnahmen der österreichisch ungarischen Monarchie für das Jahr 1901. (Estimates of receipts and expenditures of the Austro-Hungarian monarchy for 1901.)
    - ——— Vol. 2. Kriegsministerium. (War department.) 3 parts. Wien, 1900.
- Belgium: The military budget for 1901. IR., Apr., p. 130.
- Brazil: Summary of military budget for 1901. MW., July 24, p. 1692.
- Denmark: Military budget for 1900–01. IR., Apr., p. 133.
- France:
    - Note on the military budget for 1902. IR., Aug., p. 334.
    - Budget voté des dépenses de l'exercice 1901. (Budget of appropriations for the fiscal year 1901.) xliv, 499 pp. Paris, 1901.
    - Rapport fait au nom de la commission du budget chargée d'examiner le projet de loi portant fixation du budget général de l'exercice 1901 (ministère des colonies). (Report of the budget commission charged with the examination of the bill fixing the general budget of 1901) (colonial ministry). By M. le Myre de Vilers, deputy. 287 pp. Paris, 1900.
    - Budget du corps de la gendarmerie pour l'exercice 1901. (Budget for the gendarmery for the fiscal year 1901.) 15 pp. (No place, no date).
    - Budget du ministère de la guerre pour l'exercice 1901. (Budget of the war ministry for 1901.) (No place, no date.)
    - Projet de loi présenté à la chambre des députés portant fixation du budget général de l'exercice 1902. (Bill presented to the chamber of deputies, fixing the general budget for 1902.) 969 pp. Paris, 1901.

Budgets—Continued.

Germany:

Prussian military budget for 1902. RCM., Dec. 14, p. 636.

Etats für die Verwaltung des Reichsheeres auf das Rechnungsjahr 1901. (Estimates for the administration of the imperial army for the fiscal year 1901.) 829 pp. Berlin, 1900.

Estimates for German expeditionary force in China. Presented to the Reichstag Nov. 14, 1900. Translated in the intelligence division, war office. 40 pp. London, 1901.

Great Britain:

Army estimates of the effective and noneffective forces for 1901–1902. 209 pp. London, 1901.

Ordnance factories estimate. 1901–1902. 7 pp. London, 1901.

Italy:

The law on extraordinary expenditures for the army from 1901 to 1906. NMB., Aug. 15, p. 178.

The military budget for 1901–02. IR., Mar., p. 99.

Stato di previsione della spesa del ministero della guerra per l'esercizio finanziario dal 1° luglio 1900 al 30 giugno 1901. (Estimates of the expenditures of the war department for the fiscal year beginning July 1, 1900, and ending June 30, 1901.) 11 pp. Roma, 1900.

Japan: Military budget for 1901–02. RMI., May, p. 932; IR., Apr., p. 147.

Netherlands: Uitgewerkte en toelichtende staat behoorende bij de raming van kosten voor het departement van oorlog, voor het jaar 1901. (Estimates for the war department, 1901.) 247 pp. (No place) 1900.

Norway:

Oversigt over Kongeriget Norges statsindtaegter og statsudgifter. Budgetterminen 1899–1900. (Norwegian budget for 1899–1900.) 431 pp. Kristiania, 1900.

Armeens budget. (Budget of the army.) 1900–1901. 277, 64 pp. (No place, no date.)

Portugal:

Orçamento geral e proposta de lei das receitas e das despesas ordinarias e extraordinarias do estado na metropole para o exercicio de 1901–1902. (General estimates of the government for the fiscal year 1901–1902.) Lisboa, 1901.

Tabella da distribuição da despesa ordinaria e extraordínaria no exercicio de 1901–1902. Ministerio dos negocios da guerra. (Military budget for the fiscal year 1901–1902.) 35 pp. Lisboa, 1901.

Roumania: Military budget for 1901–02. RMI., May, p. 936; USM., May, p. 221.

Russia:

Military budget for 1901. IR., Mar., p. 107.

Report of the minister of finance to H. M. the Emperor on the budget of the Empire for 1901. Budget of the Empire for 1901. 49 pp. St. Petersburg, 1900.

Budgets—Continued.
- Spain: Presupuestos generales del estado para el año economico de 1900. (General estimates of the government for the fiscal year 1900.) 994 pp. Madrid, 1900.
- Sweden:
  - Military budget for 1901. IR., Mar., p. 116.
  - Statsverkspropositionen. (Government estimates.) 1901. 2 vols. Paged separately. Stockholm, 1901.
  - Bihäft till riksdagens protokoll 1901. Fjerde hufvudtiteln. (Swedish army and navy estimates for 1901.) 373, 168 pp. Stockholm, 1901.
- Switzerland:
  - Budget de la Confédération Suisse pour l'année 1900. (Budget of the Swiss Confederation for the year 1900.) 53 pp. Berne, 1899.
  - Message du conseil fédéral à l'assemblée fédérale sur le budget pour l'année 1901. (Message of the federal council to the federal assembly on the budget for 1900.) (Dated Oct. 19, 1900.) 366 pp.

Bulgaria:
- Military reforms in Bulgaria, 1899 and 1900. RMAE., Jan., p. 67.
- Reorganization of the cavalry. RMAE., Oct., p. 277; reorganization of the engineers. Idem, p. 278.
- New infantry formations. IR., Jan., p. 2.

Bullets:
- Austria: Bullet with longitudinal grooves, patented by Roth. NMB., Mar. 1, p. 239; KZ., No. 1, p. 30 (description with figs.); RAG., Feb., p. 229.
- Great Britain: Dum-dum bullets and lyddite in the Transvaal war. RAB., Mar.-Apr., p. 145.
- Various:
  - A new bullet for small-caliber rifles. RAB., July-Aug., p. 115.
  - Relative power of bullets with hollow and solid points. MA., Feb., p. 197.

Cables:
- Germany:
  - German submarine cables in the Far East. RMAE., Jan., p. 86.
  - German submarine cables. RMAE., Nov., p. 338.

Camels:
- France (Algeria and Tunis): Rôle militaire du chameau en Algérie et en Tunisie. (Military rôle of the camel in Algeria and Tunis.) By Major Wachi, of the African Light Infantry. 20 pp. Paris (no date).
- Various: Zucht und Remontirung der Militärpferde aller Staaten. (Military horse breeding and remount service in all countries.) Goldbeck. 415 pp. Berlin, 1901.

Canadian contingents:
- Organization, equipment, dispatch, and service of the Canadian contingents during the war in South Africa, 1899–1900. (Department of militia and defense of the Dominion of Canada—Supplementary report.) 192 pp., 2 maps. Ottawa, 1901.

Canals:

- Canada: Annual report of the department of railways and canals for the fiscal year from July 1, 1899, to June 30, 1900. xliv, 259 pp.; maps, etc. Ottawa, 1901.
- Germany:
  - The strategical significance of waterways in general and of those proposed by the Prussian government in particular. MW., Feb. 18, p. 375; translation: JRUSI., May, p. 631; RCM., Mar. 23, p. 309.
  - The Prussian canal projects. Eg., May 24, p. 660.

Canned goods (*see* Rations).

Canteens:

- Great Britain: The canteen question. (Lecture.) JRUSI., Aug., p. 962.
- United States: History of the military canteen. By Lieut. Col. Philip Reade, major, 4th U. S. infantry. 168 pp.; illustrated. Chicago, 1901.

Capped projectiles (*see* Armor-piercing projectiles).

Carbines (*see* Rifles).

Carriages, gun:

- Austria: 8-cm. model 75 field-gun carriages with depression lever. (With plate.) MGAGW., No. 6, p. 450.
- Various:
  - Various systems of field-gun carriages with recoil on carriage. (Ill.) KZ., No. 5, p. 248; IR., Sup. 26, p. 734.
  - Comparative study of cradle and rigid carriages from the standpoint of practical performance. KZ., No. 7, p. 361.
  - Rigid carriages and "deformation" carriages. RAG., Oct., p. 89.
  - On the most advantageous form of trail in long-recoil carriages. SMB., Nov., p. 430.

Carrier pigeons (*see* Pigeons).

Cartridge holder:

- Great Britain: A new bandolier and cartridge holder. AE., Nov., p. 178.

Casemates:

- Casemates of concrete with embrasures protected by metallic plates. (Ill.) RAG., Feb., p. 188.

Cavalry (*see also* Drill regulations):

- Austria:
  - Notes on the Austro-Hungarian cavalry. RMAE., Oct., p. 269.
  - Hand- und Nachschlagebuch für den Cavalleristen. (Hand and reference book for cavalrymen.) By Georg von Klarenbach, Austro-Hungarian colonel, ret. xv, 512 pp., 5 pl. Wien und Leipzig, 1901.
- Bulgaria: Reorganization of the cavalry. RMAE., Oct., p. 277.
- France:
  - Prospective reorganization of the cavalry. IR., Sept., p. 371; JUSII., p. 347.
  - Cavalry corps. (Discussion.) RC., Jan., p. 385.

Cavalry—Continued.

Germany:

- Organization, conduct, and employment of the cavalry at the imperial maneuvers of 1899 and 1900. IR., Beih. 18, p. 1.
- The cavalry service. (Review of Pelet-Narbonne's book.) MW., May 8, p. 1074.
- The German cavalry at the maneuvers of 1900. RC., Mar., p. 641.

Great Britain:

- The English cavalry in South Africa. NMB., Mar 1, p. 207.
- What is required to improve the training of our cavalry in peace time? USM., Dec., p. 263.

Roumania: Change in the organization of the cavalry. RMAE., Jan., p. 90.

Russia: Modification of cavalry depot organization, JRUSI., Sept., p. 1146.

Various:

- Dismounted cavalry warfare. JUSII., July, p. 181.
- How should cavalry attack infantry? RCM., Feb. 16, p. 189.
- Cavalry in mountain warfare. RCM., Aug. 17, p. 192.
- Cavalry on the field of battle. RCM., Oct. 5, p. 368.
- Cavalry in fortress warfare. KZ., No. 9, p. 457.
- Cavalry or mounted infantry? JSM., Mar., p. 419.
- Notes on the evolution of cavalry. USM., Jan., p. 327.
- Cavalry tactics. (Lecture.) RC., June, p. 257.
- The individual instruction of the cavalryman in field service. RC., Oct., p. 20.
- Idées pratiques sur le service de la cavalerie. (Practical hints on cavalry service.) By General Rosenberg, of the German cavalry. Translated from the German. 3d edition. 159 pp. Paris-Nancy, 1898.
- Der Kavaleriedienst. Ein Handbuch für Offiziere. (The cavalry service. A handbook for officers.) Prepared and published by G. v. Pelet-Narbonne. Vol. I. Die Ausbildung in Frieden. (Training in peace.) 5th, revised edition. xix, 466 pp. Berlin, 1901.

Chile:

- Recruits and effectives in 1901. MW., July 24, p. 1693.

China:

- The military events in China, 1900-1901. RMAE., Feb., p. 184; Aug., p. 108.
- War matériel in China. RAG., Jan., p. 130.
- A Chinese military school at Tsitsikar. (Description.) RCM., May 25, p. 552.
- Correspondence respecting the insurrectionary movement in China. 115 pp. Lond., 1900.
- Die Wirren in China. (The troubles in China.) By First Lieut. A. von Müller. Part I. Vorgeschichte. Deutschlands Interessen in Ostasien. Boxerbewegung. Streitkräfte. Die ersten Kämpfe. Rüstungen der Verbündeten. (Preliminary history. Germany's interests in East Asia. The boxer movement. Armed forces. The first battles. Preparations of the allies.) pp. 1-77; maps, etc. Berlin, 1900.

China—Continued.

Die chinesische Armee und Kriegsflotte. (The Chinese army and navy.) 19 pp. Berlin, 1900.

China and the present crisis, with notes on a visit to Japan and Corea. By Joseph Walton, M.P. With a map of China. 2d edition. xii, 319 pp. London, 1900.

Further correspondence respecting events at Peking. 32 pp. London, 1901.

Reports on military operations in South Africa and China. (Military Information Division publication No. 33.) 600 pp.; maps, etc. Washington, 1901.

Chinese expedition:

Germany:

The transportation of the East Asiatic expeditionary corps. MW., Jan. 16, p. 107; p 217.

The German expeditionary corps for China. JUSII.. Apr., p. 141.

Estimates for German expeditionary force in China. Presented to the Reichstag, Nov. 14, 1900. Translated in the intelligence division, war office. 40 pp. London, 1901.

Clarke automatic sight. (Description and pls.) MA., Mar., p. 235.

Clothing (*see* Uniforms).

Coaling stations:

Various: Coaling and naval stations of England, United States, France, Russia, Italy, and Germany. IR., Nov., p. 485.

Coast defense (*see* Defense, coast).

Cockerill-Nordenfelt (*see also* Nordenfelt-Cockerill):

A few words on the Cockerill-Nordenfelt field guns. RAB., Jan.-Feb., p. 115.

Tests with, in Belgium. JDAM., Dec., p. 363.

Colombia:

Colombia and Venezuela. (Army system, etc.) MW., Sept. 18, p. 2129; RCM., Oct. 5, p. 364.

Colonial troops (*see also* Indian army, British, Dutch, and Handbooks of various armies under "Organization"):

France:

The French colonial army. (Composition.) NMB., Feb. 1, p. 135; IR., Feb., p. 48.

Organization of the colonial artillery. MGAGW., No. 5, p. 414.

Uniting of colonial troops at home into a colonial army corps. IR., Aug., p. 335.

The status of commanding officers in the different colonies. IR., Sept., p. 377; RCM., Nov. 30, p. 587.

Organization of the colonial army. RCM., Jan. 19, p. 89; Feb. 23, p. 224; June 22, p. 641; June 29, p. 673; general staff of: July 27, p. 126; changes: Oct. 26, p. 465.

Colonial telegraphists. RCM., July 27, p. 126.

Composition of gendarmery in Madagascar. RCM., Aug. 3, p. 151.

L'armée coloniale de la France de 1900. (The French colonial army of 1900.) By D.-X. 32 pp. Paris.

Colonial troops—Continued.

France—Continued.

Almanach du marsouin, 1901. Annuaire illustré de l'armée coloniale. (Almanac of the marine infantry soldier. Illustrated yearbook of the colonial army.) By Ned Noll. 158 pp.; illustrated. Paris.

Germany: Organization, etc., of the colonial troops. JRUSI., Aug., p. 1020.

Italy: Reorganization of defense of Eritrea. RCM., Nov. 2, p. 491.

Netherlands: Koloniaal Verslag van 1900. (Colonial report for 1900.) 's Gravenhage, 1900.

Portugal: Reenforcement of the colonial troops. IR., Jan., p. 23.

Various:

On colonial troops. JDAM, Feb., p. 127.

Colonial army systems. (Military Information Division Pub. No. XXXIV.) 133 pp., 1 map. Washington, Nov., 1901.

Colonies (*see also* under name of each colony):

France:

Study of the resources of the French colonies from the standpoint of feeding troops. RSIM., Mar., p. 217; the principal alimentary products of the French colonies, p. 219.

French expansion in Central Africa. RCM., Aug. 31, p. 237.

Great Britain: The colonial office list for 1901. xxxi, 512 pp.; with maps. London.

Italy: Notes on colony of Eritrea in 1900. MW., Jan. 19, p. 232.

Netherlands: Koloniaal Verslag van 1900. (Colonial report for 1900.) 's Gravenhage, 1900.

Various:

Africa and colonial expansion. (With map.) RMU., Nov., p. 143.

The partition of Africa (showing colonies of each country). RCM., May 25, p. 556.

L'expansion coloniale. (Colonial expansion) Part 2. Possessions des puissances européennes en Asie et en Océanie. (Possessions of the European powers in Asia and Oceania.) 169 pp.; illustrated. Paris, 1899.

Commands, apparatus for giving military. (Ill.) SMB., May, p. 190.

Communication, lines of (*see* Lines of communication).

Communication troops:

Germany: Experiment detachment of the communication troops. RMAE., May, p. 436.

Compagnie des Forges et Aciéries de la Marine et des Chemins de Fer. Exposition de 1900. (Exhibit at the Paris Exposition.) 60 pp. St. Étienne, 1900.

——— The same. Note sur les établissements de la compagnie. (Notes on the company's works.) 22 pp., 8 pl. St. Étienne, 1900.

Conserves (*see* Rations).

Constabulary (*see* Police).

Cordite:

Cordite and lyddite. RAG., Mar., p. 377.

The cordite of to-day. AE., May, p. 67.

Erosion of guns by cordite. Eg., July 12, p. 47.

Cordite. (Notes on corrosion, etc.) IR., Sup. 24, Mar., p. 665.

Courts-martial:
  Great Britain: Military and naval courts-martial and their defects. USM., Nov., p. 120.
  Switzerland: Die Zuständigkeit der militärischen Gerichte in der Schweiz. (The jurisdiction of military courts in Switzerland.) By Prof. Dr. A. Schneider, colonel on the justice staff. 24 pp. Basel, 1901.
Crests:
  Great Britain: Official crests of the British army now in daily use. 132 designs. London and Aldershot (no date).
Crossing streams:
  France:
    Notice sur le radeau sac et considérations générales sur les passages des cours d'eau. (Notes on the "sack raft" and general notes on the passage of water courses.) By Capt. J. Habert. 70 pp., 12 pl. Chalons-sur-Marne, 1900.
    Les passages de rivières par la cavalerie. (The passage of rivers by cavalry.) By Capt. D. Géraud. 108 pp. Paris-Nancy, 1898.
  Germany: Swimming of a river by an infantry regiment. RCM., Oct. 26, p. 466.
  Great Britain: New matériel for crossing streams. RAG., Oct., p. 142.
  Russia: Crossing a river by a cavalry division by swimming. SMB., Nov., p. 459; USM., Nov., p. 206.
Cryptography.
  Italy: Military cryptography in the field. RAG., Nov., p. 215.
  Various: Study on cryptography, its use in war and diplomacy. RAB., Jan.-Feb., p. 53.
Curved fire (*see* Fire, curved).
Cycling, military (*see* Bicycles).
Darmancier & Dalzon:
  Description of breech mechanisms. RA., June, p. 186.
  75-mm. field gun. (Ill.) Eg., Mar. 29, p. 397.
  Artillerie. Système Darmancier & Dalzon. (Ordnance. System Darmancier & Dalzon.) Compagnie des forges et aciéries de la marine et des chemins de fer. (Mountain, landing, field, siege, and fortress, seacoast and naval artillery, and armored turrets and casemates.) 106 pl. St. Chamond, 1900.
Daudetau rifles:
  Ballistics of. JSM., Jan., p. 71.
  The Daudetau rifle. (Numerical data, etc.) RAG., Mar., p. 382; RA., Nov., p. 103 (with plate).
Defense:
  France: La nouvelle défense de Paris avec notes géologiques, historiques et principes de sécurité. (The new defense of Paris; with geological and historical notes and rules of safety.) 27 pp. Paris (no date).
Defense, coast:
  Great Britain: Thoughts on coast defense suggested by the Boer war. (With chart.) PRAI., Mar., p. 661.
  Spain: Some hints relative to the defense of our coasts. MA., Mar., p. 209.

Demolitions:

- Great Britain: Instruction in military engineering. Part IV. Mining and demolitions. Compiled at the school of military engineering, Chatham. 5th edition. 1900. x, 142 pp., 34 pls. London, 1900.
- Various: Les destructions d'obstacles en campagne. (Demolitions in in the field.) By Major Bornecque. 128 pp., 42 figs. Paris, 1900.

Deport gun:

- Note on. JDAM., Dec., p. 362.

Details:

- France: Regulations for details of officers to other arms than their own. IR., July, p. 278.

Disappearing targets (*see* Targets).

Diseases:

- The significance of infectious diseases in the army. (Lecture.) OMWV., Vol. LXII, p. 278.
- Malarial fever. RCM., Mar. 16, p. 290.
- Die Krankheiten im Kriege. (Diseases in war.) By Dr. Knaak, staff surgeon. 183 pp. Leipzig, 1900.
- Précis de pathologie exotique (maladies des pays chauds et des pays froids). (Manual of exotic pathology—diseases of warm countries and cold countries.) By Prof. A. Le Dantec. 936 pp., 98 figs. Paris, 1900.
- Traité pratique des maladies des pays chauds et tropicaux. (Practical treatise on the diseases of warm and tropical countries.) By Dr. J. Brault, ex-chief surgeon of the army, etc. 534 pp., 93 figs. Paris, 1900.

Dismounted cavalry (*see* Cavalry).

Distribution (*see* Organization).

Districts, military:

- Argentina: Division into military districts. MW., July 24, p. 1691.

Dogs, war:

- Great Britain: Introduction of, in English army. IR., Nov., p. 464.

Dress (*see* Uniforms).

Drill regulations:

- Argentina: Táctica de artillería de campaña. (Field artillery tactics.) 2d official edition. Decree of April 5, 1900. xvi, 196 pp. Buenos Aires, 1900.
- Colombia: Táctica de infantería adaptada á la topografía sudamericana y á los rifles de ultima invención. (Infantry drill regulations, adapted to South American topography and to the latest rifle models.) Translated and adjusted to the necessities of the Army of Colombia, by Henry R. Lemly, captain in the U. S. Army, etc., and Alejandro B. Ruiz, colonel in the army of Colombia, etc. 3d revised edition. viii, 253 pp. Nueva York, 1901.
- France:
  - Les règlements d'exercices de la cavalerie allemande et française. Leur comparaison. (The German and French cavalry drill regulations. Their comparison.) By Naëj. 43 pp. Paris (no date).

Drill regulations—Continued.
  France—Continued.
    Projet de règlement sur l'exercice et les manœuvres de l'infanterie. (Provisional drill regulations for the infantry.) 132, 60, 65 pp., 2 pl. Paris, 1901.
  Germany:
    Les règlements d'exercices de la cavalerie allemande et française. Leur comparaison. (The German and French cavalry drill regulations. Their comparison.) By Naëj. 43 pp. Paris (no date).
    Exerzir-Reglement für den Train. (Drill regulations for the train.) New edition, with the addition of the music for signals of June, 1897. ix, 103 pp. Berlin, 1894.
    Exerzir-Reglement für die Kavallerie. (Drill regulations for the cavalry.) New edition, with the addition of the new music for signals of June, 1897. xii, 257 pp. Berlin, 1895.
    Drill regulations of the German field artillery, 1899. Revised in the intelligence division, war office, by Maj. J. H. V. Crowe. 208 pp., charts. London, 1901.
  Great Britain:
    Cyclist drill. 1900. 35 pp. London, 1900.
    Siege artillery drill. 1900. 135 pp. London.
  Mexico: Reglamento para el ejercicio y maniobras de la caballería. (Cavalry drill regulations.) Decree of June 25, 1897. 2 vols. 250, 240 pp. Mexico, 1900–01.
  Netherlands:
    Exercitie-reglement der cavalerie. Pelotonsschool te voet. (Cavalry drill regulations. School of the platoon dismounted.) 30 pp. Breda, 1900.
    Reglement op de exercitien der infanterie. De compagnie, het bataljon en het regiment. (Infantry drill regulations. The company, battalion, and regiment.) v, 114 pp. Breda, 1900.
  Spain: Reglamento para la instrucción táctica de las tropas de caballería. (Cavalry drill regulations.) 3 vols. and appendix. 285, 164, 95, 120 pp.; plates. Madrid, 1899–1900.
  Switzerland: Règlement d'exercice pour l'artillerie de montagne suisse. (Drill regulations for Swiss mountain artillery.) Adopted by the Federal Council Feb. 13, 1900. xi, 224 pp. Berne, 1900.
Dum-dum bullets (*see* Bullets).
Dursley-Pedersen military folding bicycle. (Ill.) KZ., No. 5, p. 274.
Echelons:
  Various: Maneuvering by echelons. RC., May, p. 129.
Education:
  Austria: Military education and training. MW., Feb. 9, p. 364.
  Various: Education of recruits in Russia, France, and Germany. IR., Dec., p. 526.
Effects of bullets (*see* Wounds).
Ehrhardt guns:
  The Ehrhardt rapid-fire gun, model 1900. (Discussion.) NMB., Jan. 15, p. 72.
  Rapid-fire guns, Ehrhardt system, C-1900. (Description and plate.) MGAGW., Heft 3, p. 227.

Ehrhardt guns—Continued.

Battery fire with Ehrhardt guns. (Discussion of a report by the factory.) SMB., Jan., p. 1; Feb., p. 55, 71.

On the Ehrhardt rapid-fire field guns, C-1900. SMB., Jan., p. 41.

Report of Norwegian experiment board on Ehrhardt guns. IR., Sup. 31, p. 915.

Ehrhardt rapid-fire artillery. RA., Jan., p. 340; RMS., Apr., p. 250 (ill.).

The Ehrhardt gun used in British army. (Ill.) Eg., Mar. 8, p. 298; SA., Apr. 27, p. 261.

Drill for 7.62-cm. (3-in.) quick-firing field gun C-1901, type Ehrhardt. 7 pp. Düsseldorf, 1901.

Quick-firing guns, type Ehrhardt, for naval, garrison, and coast-defense artillery. 1899. 8 pp., 5 pl. Düsseldorf (no date).

Electric motors and their military application. RAG., May, p. 153.

Electrical engineers:

Great Britain: England's volunteer electrical engineer corps in South Africa. NMB., Apr. 15, p. 376.

Engelhardt guns:

Russia: Notes on the 3-inch Engelhardt field gun, model 1900. JDAM., Oct., p. 105.

Engineers:

Belgium: Organization and composition of engineer troops and of the general staff of this arm. (Discussion by Brialmont.) RAB., Jan.-Feb., p. 5.

Bulgaria: Reorganization of the engineers. RMAE., Oct., p. 278.

France:

New formations and redistribution of the engineer troops. MGAGW., No. 3, p. 242.

Effective strength, etc., of engineers of colonial army. RMI., Oct., p. 1879.

Reorganization of engineers. IR., Apr., p. 170.

Duties of the engineers. RCM., Dec. 14, p. 635.

Germany: On the reorganization of the engineer and pioneer corps in the German army. JDAM., Feb., p. 162.

Great Britain:

Regulations for engineer services. 1900. 296 pp. London.

Manual of military engineering. (Provisional edition.) vii, 194 pp., 64 pl. London, 1901.

Russia: Allotment of engineer matériel to Russian troops. RGM., July, p. 75.

Sweden: Proposed reorganization of the Swedish engineers. RGM., July, p. 76.

Switzerland:

The engineers (organization, matériel, etc.). RMS., Jan., p. 32; Feb., p. 114.

Organization of the engineers of the Swiss army. RMS., July, p. 515.

Various: The rôle of engineer troops in the field. RMS., May, p. 359.

Equipment:
  Germany: The outfit carried by the German infantryman on the march in war. IR., July, p. 274.
  Great Britain: Uniform and equipment. (Discussion.) JUSII., Jan., p. 68.
Erosion of guns:
  Great Britain: Erosion of guns by cordite. (Figs.) Eg., July 12, p. 47.
Escorts:
  Various:
    The tactics of the artillery escort. PRAI., Mar., p. 639.
    Escorts for horse artillery. PRAI., Mar., p. 643.
Estimates (*see* Budgets).
Expenditures, military (*see* Budgets).
Experiments (ordnance and small arms):
  Austria: Review of experiments with ordnance and small arms in 1899 and 1900. MGAGW., No. 5, p. 345.
Explosives (*see* Powders and explosives).
Factories:
  Belgium: Belgian small-arms factories. (Ill.) RA., Aug., p. 360.
  Germany:
    Rheinische Metallwaren und Maschinenfabrik, Düsseldorf. SMB., Jan., p. 23.
    The Krupp shops. (Short account.) RMS., Sept., p. 731.
  Great Britain: Vickers' gun-mounting works. (Ill.) Eg., July 26, p. 110.
  Russia: Russian small-arms factories. RA., Apr., p. 5.
  Various: Government factories for war matériel in various countries NMB., Feb. 1, p. 116.
Farriery:
  Russia: Establishment of field forges in artillery. IR., June, p. 258.
Fencing:
  France:
    Apparatus for fencing with swords. KZ., No. 6, p. 336.
    The fencing horse, devised by Monlun. (With ill.) JRUSI., Mar., p. 356.
  Russia:
    Prize fencing contests in the cavalry. IR., Aug., p. 350.
    Bayonet exercises with oscillating dummies. (Ill.) SA., May 25, p. 324.
Field artillery (*see also* Field guns; Rapid-fire guns):
  Argentina: Notes on armament, etc., of field artillery. MW., Jan. 19, p. 231.
  Austria:
    Reorganization of the field artillery. RAG., Mar., p. 410.
    Taschenbuch für die k. und k. Feldartillerie. (Pocket manual for the Austro-Hungarian field artillery.) Prepared and published by Anton Korzen, artillery engineer, and Ludwig David, artillery captain. x, 342 pp.; illustrated. Wien, 1900.

Field artillery—Continued.

France:

Concerning the reorganization of the field artillery. RAG., Feb., p. 259.

Notes on the new French field artillery. (Ill.) RAG., Mar., p 371.

Reorganization of the field artillery. RAG., June, p. 414.

The employment of the French rapid-fire artillery in the provisional infantry drill regulations (Vol. III, Title XII). JDAM., Sept., p. 267.

L'artillerie de campagne, 1792–1901. Étude technique et tactique. Artillerie lisse—Artillerie rayée—Artillerie française et allemande en 1901. (Field artillery, from 1792 to 1901. A technical and tactical study. Smooth-bore guns—rifled guns—French and German artillery in 1901.) By Lt. J. Campana, of the 11th regiment of artillery. ix, 413 pp., 24 figs., 4 maps. Paris–Nancy, 1901.

Germany:

Composition and armament of the German field artillery. USM., May, p. 218.

The employment of field artillery armed with rapid-fire guns. JDAM., June, p. 281.

Recent changes in German field artillery matériel. PRAI., Feb., p. 571.

Entwickelung des Massengebrauchs der Feldartillerie und des Schiessens in grösseren Artillerieverbänden in Preussen. Für Offiziere aller Waffen. (Evolution of the employment of masses of field artillery and of firing in large artillery units in Prussia. For officers of all arms.) By E. v. Hofbauer, general of artillery. vii, 301 pp. Berlin, 1900.

Der Dienstunterricht der Unteroffiziere der Feldartillerie. (Service instruction of noncommissioned officers of field artillery.) By Captain Anders. 3 parts. 64, 49, 37 pp. Berlin, 1901.

Drill regulations of the German field artillery, 1899. Revised in the intelligence division, war office, by Maj. J. H. V. Crowe. 208 pp., charts. London, 1901.

L'artillerie de campagne, 1792–1901. Étude technique et tactique. Artillerie lisse—Artillerie rayée—Artillerie française et allemande en 1901. (Field artillery, from 1792 to 1901. A technical and tactical study. Smooth-bore guns—rifled guns—French and German artillery in 1901.) By Lt. J. Campana, of the 11th regiment of artillery. ix, 413 pp., 24 figs., 4 maps. Paris–Nancy, 1901.

Italy: Reorganization of the field artillery. IR., July, p. 298.

Russia: Reorganization of the field artillery. RAG., Apr., p. 143; May, p 264; USM, p. 221.

Various:

Field artillery in fortress warfare. KZ., No. 2, p. 49.

Foreign field artillery (matériel, etc.). NAT., No. 1, p. 50.

On the training of field artillery. OMWV., Vol. LXII, p. 124.

The use of artillery in the field. OMWV., Vol. LXII, p. 260.

Field artillery—Continued.

Various—Continued.

The employment of artillery in the field. By Lt. Col. F. G. Stone, R. A. (Selected papers Canadian Military Institute.) 1900. Welland, Ont.

L'artillerie de campagne, 1792–1901. Étude technique et tactique. Artillerie lisse—Artillerie rayée—Artillerie française et allemande en 1901. (Field artillery, from 1792 to 1901. A technical and tactical study. Smooth-bore guns—rifled guns—French and German artillery in 1901.) By Lt. J. Campana, of the 11th regiment of artillery. ix, 413 pp., 24 figs., 4 maps. Paris-Nancy, 1901.

Field glasses:

Germany: Hints on the use of the Zeiss binocular field glass. KZ., No. 9, p. 477.

Various:

Optical instruments for officers. (Ill.) NAT., No. 1, p. 1.

Field glasses. (Ill.) MA., Jan., p. 47.

Note on field glasses for service. PRAI., Feb., p. 579.

A safety military field glass. SA., Jan. 5, p. 10. (Ill.)

Field guns (*see* Rapid-fire field guns).

Field howitzers (*see* Howitzers).

Field service:

France: Décret du 28 mai 1895 portant règlement sur le service des armées en campagne. (Decree of May 28, 1895, promulgating regulations on the service of armies in the field.) 10th edition, annotated and brought up to date. xx, 182 pp. Paris, 1899.

Germany:

The field service regulations (Felddienst-Ordnung, 1900) of the German army. 1900. Translated for the intelligence division, war office, by Col. H. S. Brownrigg, P. S. C. viii, 214 pp. London.

Was enthält die Felddienstordnung vom 1. Januar 1900 Neues? (What is there new in the field service regulations of January 1, 1900?) By Major Albrecht. 63 pp. Berlin, 1900.

Lehnert's Handbuch für den Truppenführer. Für Feldgebrauch Felddienst, Herbstübungen, Übungsritte, Kriegspiel, taktische Arbeiten, Unterricht, u. s. w. (Lehnert's handbook for the troop leader. For field use, field service, autumn maneuvers, practice rides, war game, tactical studies, instruction, etc.) 20th, enlarged and completely revised edition. xii, 216 pp. Berlin, 1901.

Russia: Russische Gefechts-Vorschrift. (Russian regulations for troops in battle.) Published provisionally in the summer of 1900. Translated by Capt. Victor Grzesicki. viii, 212 pp. Wien, 1901.

Filters:

France: New filter for the French army. KZ., No. 9, p. 501.

Finland:

New regulations on military liability. MW., Aug. 31, p. 1993; JRUSI., Aug., p. 1023.

- Fire, artillery (*see also* Target practice):
  - Austria: Firing from coast guns. (A study.) MGAGW., No. 2, p. 91.
  - Germany:
    - The fire of the German foot artillery, according to the firing instruction of July 9, 1900. RA., June, p. 252.
    - Method of firing with r. f. guns. MW., Dec. 11, p. 2851.
  - Various:
    - Prepared fire of fortress artillery, with the use of the goniometer. RAG., Oct., p. 99.
    - The distribution of artillery fire. RMS., Aug., p. 579.
- Fire, curved:
  - Various: Curved fire in the field. MA., Aug., p. 151.
- Fire, howitzer (*see also* Howitzers):
  - Germany: Firing with field howitzers. (Figs.) MW., Jan. 30, p. 287; Mar. 16, p. 614; Mar. 27, p. 747.
- Fire, infantry;
  - Various: The limitations of infantry fire control and discipline. (Lecture.) JUSII., Apr., p. 117.
- Fire, seacoast:
  - Various: Rules for seacoast fire. MA., Apr., p. 334; Aug., p. 113; Sept., p. 236.
- Fire, shrapnel:
  - Various: Theory and practice of fire with shrapnel. (With pls.) MA., Feb., p. 141.
- Fire tactics:
  - Various: The development of infantry fire tactics in the nineteenth century. NMB., May 1, p. 385.
- Firing at balloons:
  - Austria: Firing experiments at a balloon. IR., Oct., p. 431.
  - Germany: Firing at a balloon. (Note.) IR., Sup. 31, p. 918.
  - Various: Estimation of the results of shots and conduct of fire in firing at captive balloons. RAG., Mar., p. 363.
- Firing grounds (*see* Target ranges).
- Firing instruction (*see also* Target practice):
  - Austria: The new firing regulations of the field artillery. MA., Jan., p. 76.
  - France:
    - Instruction sur la formation des pointeurs dans les corps de troupe de l'artillerie. (Instructions for the training of gunners in the artillery.) Approved Nov. 8, 1888. 2d edition. 127 pp., 2 pl. Paris, 1899.
    - Règlement sur l'instruction du tir. (Regulations on firing instruction.) Approved May 22, 1895; modified by notes of Feb. 25, Mar. 19, May 20, and Oct. 13, 1896. 7th edition. 144 pp. Paris, 1899.
  - Germany:
    - The new firing instructions for foot artillery, 1900. RAG., May, p. 221.
    - Proposed firing regulations for infantry. MW., Feb. 13, p. 379.

- Firing instruction—Continued.
  - Germany—Continued.
    - Instructions of Aug. 19, 1899, on the fire of the German field artillery. (French translation.) SM., Nov. 15, p. 291.
    - Schiessanleitung für die Fussartillerie. (Firing instructions for foot artillery.) 56 pp. Berlin, 1900.
    - Schiessvorschrift für die Kavallerie. (Firing instructions for cavalry.) viii, 128 pp. Berlin, 1901.
    - Règlement sur le tir de l'infanterie dans l'armée allemande. (German infantry firing regulations.) Approved Nov. 16, 1899. Translated from the German and brought up to date by Lieutenant Colonel Vonderscherr, commander of the normal firing school. xi, 198 pp. Paris–Nancy, 1900.
  - Great Britain: New regulations for firing instruction of infantry and cavalry officers. IR., Mar., p. 96.
  - Russia: Firing regulations for fortress and siege artillery, 1900. (Translation.) MGAGW., No. 1, p. 45.
  - Switzerland: Firing instruction of the Swiss infantry. MW., Mar. 30, p. 777.
  - Various:
    - Training of sharpshooters. (Ill.) KZ., No. 10, p. 543.
    - Méthode pour l'instruction individuelle du tir. (Method for individual instruction in firing.) By Major Montaigne. 51 pp. Paris (no date).
- Firing regulations (*see* Firing instruction).
- Firing schools:
  - Argentina: New organization of the normal firing school. IR., Aug., p. 329.
  - France: The firing schools of the French artillery. MW., Apr. 17, p. 893.
  - Germany:
    - Regulations for the foot artillery firing school. RAG., Mar., p. 395.
    - Regulations for the field artillery firing school. RAG., Apr., p. 123.
    - Bestimmungen für die Feldartillerie Schiesschule. (Regulations for the field artillery firing school.) v, 37 pp., 1 pl. Berlin, 1901.
  - Russia: The attendance at the artillery firing school in 1901. SMB., Nov., p. 462.
  - Various: Firing schools in all countries. NMB., Jan. 1, p. 34.
- Firing tables:
  - Calculation of firing tables for howitzers and mortars. NAT., No. 2, p. 79.
- Firing at sea. OMWV., Vol. XLII, p. 381.
- Firing tests:
  - Austria: Note on firing tests against a fortified field position. JDAM., Dec., p. 364.
  - France: Firing tests with melinite against armored turrets. IR., July, p. 277.
  - Various: The practical execution of firing tests with guns. NAT., No. 1, p. 25.

Foot artillery:

Germany: New 10-cm. gun for foot artillery. MA., Sept., p. 306.

Forbes:

Test of a new range finder of Prof. Forbes. SMB., Oct., p. 420; SA., Aug., p. 122; SA., Oct., p. 261.

Forges, field:

Russia: Establishment of instructional forges in the artillery. IR., June, p. 258.

Fortification:

France: Manuel complet de fortification, rédigé conformément au programme du cours professé à l'école spéciale militaire et au programme d'admission à l'école supérieure de guerre. (Complete manual of fortification, edited in accordance with the curriculum of the special military school and the entrance program at the superior war school.) By H. Plessix, colonel of artillery, retired; and E. Legrand-Girarde, lieutenant colonel of engineers. 3d edition. xiii, 730 pp. Paris-Nancy, 1900.

Germany: Feldbefestigungs-Vorschrift. (Regulations for field fortification.) vi, 84 pp. Berlin, 1893.

Italy: Fortificación de montaña. (Mountain fortification.) By E. Rocchi, lieutenant colonel of engineers of the Italian army. Authorized translation by Joaquín Pasqual y Vinent, captain of engineers. 112 pp. Barcelona, 1899.

United States: A text-book of field fortification. By G. J. Fiebiger, professor of civil and military engineering, U. S. Military Academy. 1st edition. vii, 166 pp., 27 pl. New York, 1901.

Fortifications (*see also* Defense):

Belgium: Enlargement of fortification at Antwerp. IR., June, p. 235.

Brazil: Inauguration of Fort Imbuhy at Rio Janeiro. RAG., Nov., p. 323.

France: Classification of French fortifications. IR., Nov., p. 454.

Germany: The new forts of Metz. RAG., Jan., p. 134.

Great Britain:

England's strongholds in Europe. IR., Sept., p. 379.

Note on fortifications of coasts of England. IR., Oct., p. 419.

Fortress artillery:

Sweden: Beskrifning över fästnings- och positionsartilleriets matériel och munition. (Description of the material and ammunition of fortress and position artillery.) First part, Chaps. IX to XVI. Stockholm, 1895–1900.

Fortress warfare:

Germany:

Fortress warfare from a strategico-tactical standpoint. By Frobenius. MW., Aug. 17, p. 1861.

Grundriss des Festungskrieges. (Outlines of fortress warfare.) For officers of all arms. By W. Stavenhagen. x, 200 pp., 2 maps. Sondershausen, 1901.

Fowler traction engines:

Data on. MGAGW., No. 9, p. 639; RGM., Aug., p. 163.

Freddi rifle:

Notes on. RMS., Feb., p. 162.

- Friberg rifle:
  - Sweden: New rifle (Friberg). MA., Jan., p. 75.
  - Germany: Concerning the trial of the Friberg rifle. IR., Feb., p. 43.
- Garrison artillery:
  - Great Britain: A garrison artillery company in the field (at Boer war). JRUSI., Sept., p. 1120.
- Gendarmery:
  - Austria: Gendarmery (organization and distribution). MW., Mar. 13, p. 604.
- General staff:
  - Austria:
    - The general staff since its reorganization. RMAE., Feb., p. 182.
    - Organische Bestimmungen für den Generalstab vom Jahre 1900. (Organic regulations for the general staff for 1900.) 16 pp. Wien, 1900.
  - Germany: The brain of an army: A popular account of the German general staff. By Spenser Wilkinson. New edition, with letters from Count Moltke and Lord Roberts. 204 pp. Westminster, 1895.
  - Great Britain: General staff duties. (Communication.) JRUSI., June, p. 862.
  - Russia: Change in organization of great general staff. IR., Feb., p. 68.
  - Servia: The Servian general staff. IR., Dec., p. 519.
  - Spain: Proposed central general staff (duties, etc.). IR., May, p. 219.
  - Turkey: Supply of officers to general staff in future. IR., Sept., p. 405; RCM., p. 487.
  - United States: Legislative history of the general staff of the army of the United States (its organization, duties, pay, and allowances) from 1775 to 1901. Compiled and annotated under the direction of Major General Henry C. Corbin, adjutant general of the army. By Raphael P. Thian, chief clerk, A. G. O. 800 pp. Washington, 1901.
  - Uruguay: Proyecto de nueva organización del estado mayor en la República Oriental del Uruguay. (Proposed new organization of the general staff in Uruguay.) By Antonio García Pérez, captain of infantry. 28 pp. Madrid, 1901.
- General staff academy (*see* War colleges).
- General staff journeys:
  - Germany: The general staff journeys in Germany. RCM., May 11, p. 509.
- Geographical service:
  - France: The labors of the geographic service of the army in 1900. RCM., July 27, p. 118.
- Giletta:
  - Great Britain: Proposed experiments with Giletta's acoustic telemeter. SA., Sept. 28, p. 199.
  - Italy: Giletta's acoustic telemeter. (Note.) RMS., Oct., p. 864.
- Great general staff (*see* General staff).
- Greece:
  - Notes on organization, recruiting, armament, etc. JRUSI., Sept., p. 1145.
  - Number of recruits enlisted in army in 1900. IR., Feb., p. 54.

- Guerrilla warfare:
  - Great Britain: Guerrilla warfare in South Africa. USM., June, p. 272.
  - Various: Guerrilla or partisan warfare. USM., May, p. 127 (continued throughout several numbers).
- Gun carriages (*see* Carriages, gun).
- Gunners:
  - France: Instruction sur la formation des pointeurs dans les corps de troupe de l'artillerie. (Instructions for the training of gunners in the artillery.) Approved Nov. 8, 1888. 2d edition. 127 pp., 2 pl. Paris, 1899.
- Guns (*see also* Ordnance material, Rapid-fire guns, Field guns, etc.):
  - Germany:
    - A new 10.5-cm. gun for foot artillery. MA., Sept., p. 306.
    - New 10-cm. guns for firing at balloons. RCM., Aug. 3, p. 153.
  - Great Britain:
    - Handbook for the 15-pdr. B. L. gun (Mark I). (Field batteries.) 1900. 87 pp., 15 pl. London.
  - Handbook for the 6-inch B. L., Marks IV, V, VI, VIa, and VII guns and mountings. 1900. 120 pp., lxi pl. London.
- Hand grenades:
  - Mexico: Cavalry provided with. JRUSI., Mar., p. 360.
- Hard tack (*see* Biscuit).
- Heavy artillery:
  - Great Britain:
    - A garrison artillery company in the field (at Boer war). JRUSI., Sept., p. 1120.
    - Training, organization, and equipment of companies of royal garrison artillery with medium guns and howitzers, and their tactics in future field operations. (Prize essays.) PRAI., May-June, pp. 97, 113; July-Aug., p. 187; Sept.-Oct., pp. 251, 265.
    - Heavy batteries. USM., Nov., p. 193.
  - Switzerland:
    - The position artillery at the grand maneuvers of 1900. RAG., Jan., p. 121.
- Heliograph:
  - The heliograph in the service of information. (Ill.) KZ., No. 4, p. 206.
- High explosive shells. Eg., Aug. 2, p. 156; Aug. 9, p. 195.
- Horse artillery:
  - Austria: A suggestion on the future organization of our horse artillery. OMWV., Vol. LXII, p. 338.
  - France:
    - New gun for horse batteries. JDAM., Nov., p. 242.
    - The horse batteries of the French cavalry divisions. MW., Oct. 5, p. 2305.
    - Cavalry gun (the proper gun for horse artillery). MA., Aug., p 210.
    - Horse artillery (the proper gun for). USM., Oct., p. 46.

Horses:

- Germany:
  - Society for the improvement of German officers' horses. JDAM., Aug., p. 198.
  - Census of horses in 1900. JRUSI., June, p. 898.
- Great Britain:
  - Measures to increase horse-breeding for military purposes. MW., Sept. 28, p. 2346.
  - The horses of the English (in Boer war). SMB., Oct., p. 449.
  - The horse in the South African war. Some causes of the waste of life and how to remedy them. USM., May, p. 196.
- Madagascar: Horse-breeding in. (Note on.) RC., Oct., p. 102.
- Netherlands (India): The horses in Dutch India. MS., Oct., p. 765.
- South Africa: The military horses of the Boers. SMB., July, p. 305.
- Various:
  - Dressage et conduite du cheval de guerre. (Training and conduct of the war horse.) By General Jules de Benoist. xv, 200 pp., 35 figs. Paris–Nancy, 1899.
  - Zucht und Remontirung der Militärpferde aller Staaten. (Breeding of military horses and remount service in all countries.) By Dr. Paul Goldbeck, veterinary surgeon in the 2d Brandenburg uhlan regiment. ix, 415 pp. Berlin, 1901.

Hospitals, field:

- Great Britain (India): A new system of field hospitals and ambulance for hill warfare. By C. J. McCartie. 6 pp., 2 pl. Calcutta (no date).

Hospitals, military:

- France (Africa): The military hospital of Bizerta. (Ill.) RAG., Feb., p. 237.

Hotchkiss:

- The Hotchkiss machine gun. (Description and plate.) MGAGW., No. 6, p. 455.
- 47-mm. semiautomatic gun (Hotchkiss). (Ill.) Eg., Mar. 22, p. 361.
- The Hotchkiss 37-mm. automatic gun. (Ill.) Eg., Mar. 15, p. 328.
- The Hotchkiss 47-mm. rapid-fire gun on central pivot mounting. (Ill.) Eg., Mar. 15, p. 329.
- Instruction sur la mitrailleuse automatique Hotchkiss (modèle 1899). (Instructions concerning the Hotchkiss automatic machine gun, model 1899.) 18 pp., 1 pl. Paris, 1899.
- Description of the Hotchkiss automatic machine gun (rifle caliber), model 1899. (Société Anonyme des Anciens Établissements Hotchkiss & Cie., Paris.) 17 pp., 12 pl. 1899.
- Handbook of the 3-pounder Hotchkiss quick-firing gun (land service). 1900. 34 pp., 16 pl. London.
- Société anonyme des anciens établissements Hotchkiss et Cie., Paris. Catalogue du matériel de la guerre. (Catalogue of war material.) 46 pp.; illustrated. Paris, 1900.

Howitzers:

- Austria: Notes on 24-cm. field howitzer. Eg., Mar. 8, p. 301.
- France:
  - Schneider-Canet quick-firing guns and howitzers for field service. Eg., July 26, p. 107.

Howitzers—Continued.
  France—Continued.
    The field howitzer question. JSM, July, p. 95; RAG, Oct., p. 127.
    Note on field howitzers. RAG., July-Aug., p. 110.
  Germany:
    Additional information on the 10.5-cm. model 1898 light field howitzer and the 15-cm. heavy field howitzer. RA., Apr., p. 80.
    On the use of field howitzers in field and position warfare. JDAM., May, p. 198.
    Data on heavy field howitzer. JDAM, Sept., p. 308.
    Field howitzers. A contribution to the organization of foot artillery. JDAM., Nov., p. 204.
    Firing with field howitzers. (Figs.) MW., Jan. 30, p. 287; Mar. 16, p. 614; Mar. 27. p. 747; RAB., Mar.-Apr., p. 135.
    The use of field howitzers in field and position warfare. MW., Apr. 10, p. 833.
    Role and employment of guns and howitzers in field artillery. RAB., Mar.-Apr., p. 115.
    The participation of the 15-cm. German heavy field howitzer in the attack on the Peitang forts. (Ill.) IR., Sup. 23, Feb., p. 618.
    Notes on use and purpose of field howitzer, according to drill regulations. IR., Oct., p. 410.
    The heavy field howitzer. MA., Jan., p. 72.
    Guns and howitzers or howitzers alone. MA., July, p. 85.
    Note on field howitzers. RAG., July-Aug., p. 110.
    Use of the 15-cm. heavy howitzer in the attack on the forts of Peitang. (Ill.) RAG., Feb., p. 249; JUSII., July, p. 243.
    The action of field howitzers. NMB., Oct., p. 363.
  Great Britain:
    Formation of three 12.7-cm. howitzer batteries. IR., Mar., p. 96.
    The training, etc., of companies of royal garrison artillery with medium guns and howitzers, etc. (Prize essays.) PRAI., May-June, p. 97, 113; July-Aug., p. 187; Sept.-Oct., p. 251, 265.
  Various:
    On the employment of field howitzers in field and position warfare. SMB., Oct., p. 477.
    The field howitzer. (Lecture: Employment, fire, organization, etc.) RMS., Sept., p. 668.
    Field howitzers and mortars in various countries. By Stavenhagen. NMB., Aug. 1, p. 105.
    The equipment of field and mountain artillery with howitzers. (Based on article by English officer.) KZ., No. 7, p. 377.
    Light or heavy field howitzers. MS., Apr., p. 291.
    Zur Verwendung der Feld-Haubitzen im Feld- und Positionskriege. Für Offiziere aller Waffen. (The employment of field howitzers in field and fortress warfare. For officers of all arms.) By E. v. Hoffbauer, general of artillery. 63 pp. Berlin, 1901.
Hydropneumatic brakes:
  France: Failure to work. RAG., July-Aug., p. 148.

Hygiene:

Great Britain: Hygiene in English barracks and at Aldershot camp. RSIM., July, p. 687.

Hylard:

Hylard rifle. E., Nov. 15, p. 502.

Hylard rifle mechanism. (Ill.) E., Nov. 22, p. 538.

Ignition of mines:

Germany: System of electrical mine ignition. (Ill.) KZ., No. 6, p. 337.

India, British: The defense of India's northwest frontier. By Col. H. B. Hanna. 32 pp. Petersfield (no date).

Indian army (British):

New changes in the Indian army. MW., Apr. 6, p. 828.

Issue of rifles to, etc. MW., July 27, p. 1735; AE., July, p. 100.

Note on armament of mountain artillery. MW., Sept. 28, p. 2348.

New military works and marine expenditure, 1901. JRUSI, May, p. 628.

Provision in estimates for volunteer force in India. JRUSI, June, p. 892.

Formation of a new transport corps, a mountain battery, and two new infantry regiments. IR., Mar., p. 95.

Rearmament of infantry, etc. IR., Apr., p. 140; Aug., p. 342.

Denomination of the native mountain batteries. IR., Sept., p. 378.

Note on changes according to budget for 1901-2. IR., Oct., p. 422.

The use of light railways in Indian warfare, etc. JUSII., Jan., p. 15.

A German view of the fighting races of the Indian army. JUSII., Jan., p. 73.

The practical training of British and native troops in India with reference to the lessons of the war in South Africa. JUSII., July, p. 153, 186; Oct., p. 261.

Distribution of the Indian army. RCM., Mar. 9, p. 274.

Indian army (Dutch):

The mobilization of the Dutch Indian troops. MW., Nov. 6, p. 2583.

Formation of a railroad and telegraph company. MW., Nov. 13, p. 2631.

Rapid-fire field guns, machine guns, etc. (appropriations for). MW., Nov. 13, p. 2632.

Composition of the military forces in Dutch India. IR., June, p. 247.

Indo-China:

Études coloniales. (Colonial studies.) À travers l'Indo-Chine. (Across Indo-China.) Cochin-China, Cambodia, Annam, Tonkin, Laos. By Eug. Lagrillière-Beauclerc. vii, 251 pp., 15 pl., 1 map. Paris, 1900.

L'Indo-Chine. Erreurs et dangers. Un programme. (Indo-China. Errors and dangers. A scheme.) By Capt. Fernand Bernard. iii, 305 pp., 1 map. Paris, 1901.

Infantry tactics (*see* Tactics).

Infantry wagons:

Switzerland: The infantry wagon, model 1899. (Ill.) RMS., July, p. 503.

Intendance:
  Belgium: New duties of the intendance in Belgium. RSIM., Oct., p. 1069.
Interpreters:
  France:
    Corps of military interpreters. MW., Apr. 3, p. 827.
    Status of military interpreters. MW., July 24, p. 1693.
    Organization of the corps of military interpreters. RCM., June 29, p. 683.
    New uniform of military interpreters. RCM., July 6, p. 15.
Inventions, miscellaneous:
  Germany: Device to prevent use of ball cartridges at maneuvers, etc. KZ., No. 8, p. 447.
Japan:
  Strength of the army and navy. (Short note.) RAB., Mar.-Apr., p. 147; USM., p. 829.
  Military budget for 1901-1902; effectives, armament, etc. RMI., May, p. 932.
  Military review; changes in organization, remount service, maneuvers, etc.: IR., Mar., p. 103; budget, organization, military ballooning, etc.: IR., Apr., p. 147; note on maneuvers of 1900: IR., May, p. 209; general staff journeys, composition of army and navy, use of bicycles in army, military rifle club: IR., June, p. 252 *et seq.*; composition of garrison of North China: IR., Oct., p. 429; notes on maneuvers of 1901: Nov., p. 469.
  The land and naval forces (composition, armament, etc.). RCM., Apr. 13, p. 410.
  Meiklejohn's Japan directory, 1901. 279 pp. Yokohama.
  Résumé statistique de l'Empire du Japon. (Statistical summary of the Empire of Japan.) xiii, 150 pp., 2 pl., 1 map. Tokio, 1901.
Judging distances. MW., Oct. 2, p. 2265; idem, Nov. 23, p. 2724; IR., Sup. 29, p. 843; MW., May 29, p. 1270 (judging distances by infantry in various countries).
Junker schools, Russian, reorganization of. JRUSI., Aug., p. 1024.
Khaki (*see* Uniforms).
Kitchen wagon:
  Italy: A field kitchen wagon. (With plates.) RAG., Oct., p. 70.
Kitchens, field:
  Switzerland: Cuisines militaires de campagne avec chevalets articulés. (Military field kitchens with articulated horses.) (Zellar system, patented. Adopted by the Swiss army. 1898.) 23 pp. Neuchâtel (no date).
Krupp:
  Krupp rapid-fire guns with long recoil. RA., Aug., p. 434.
  The latest improvements in Krupp rapid-fire field guns with recoil on carriage. (Ill.) KZ., No. 9, p. 472; USM., Dec., p. 317.
  Remarkable resistance of a Krupp gun against bursting. (Ill.) IR., Sup. 24, Mar., p. 667.
  Graphic comparison of some Krupp and Schneider-Canet guns with reference to their power to pierce armor plates. IR., Sup. 28, p. 811.

Krupp—Continued.
  - Study on rapid-fire field guns with recoil on carriage, especially the Krupp L-30 rapid-fire field gun. By Rohne. (Ill.) IR., Sup. 33, p. 943.
  - Short account of the Krupp shops. RMS., Sept., p. 731.
  - The Krupp 7.5-cm. rapid-fire field gun with long recoil, model 1901. (Description, data, pls., etc.) RMS., Oct., p. 807.
  - The Krupp 7.5-cm. rapid-fire mountain gun with long recoil, model 1901. (Description, data, pls., etc.) RMS., Nov., p. 865.
  - Krupp rapid-fire field guns, models 1899 and 1901. (Ill.) RMS., June, p. 441.
  - Notes on the construction of ordnance, No. 80. Discussion of Krupp breech mechanisms. (Extract from "La Revue Internationale." August, 1900.) Translated by Capt. Wm. W. Gibson, Ordnance Department, U. S. Army. 23 pp., 28 pl. Washington, 1901.
  - Le canon de campagne Fried. Krupp à tir rapide C-99. (The rapid-fire field gun of Fried. Krupp, construction '99.) By Maj. Gen. R. Wille. Translated from the German by Maj. E. Monthaye. 95 pp., 41 figs., 8 pl. Berlin, 1900.

Lamacchia rifle. Note on. RMI., Sept., p. 1680.

Lance boats (*see* Boats).

Landscape drawing (*see* Sketching, military).

Landwehr:
  - Austria:
    - Reorganization of the Cisleithan landwehr. RMAE., Aug., p. 135.
    - The Austro-Hungarian landwehrs. (Organization, etc.) MW., Apr. 13, p. 861.

Length of service:
  - Various: Comparative table showing the length of service of the infantry soldier in various foreign armies. JRUSI., Mar., p. 352.

Lines of communication:
  - France: Instruction du 25 avril 1900 sur le service des étapes aux armées. Organisation et fonctionnement. (Instructions of April 25, 1900, concerning the service on the lines of communication in armies. Organization and operation.) 133 pp. Paris.

Lord armored bicycle. (Ill.) JRUSI., Jan., p. 91; test firing against; JRUSI., Feb., p. 209.

Lyddite:
  - Cordite and lyddite. RAG., Mar., p. 377.
  - Dum-dum bullets and lyddite in the Transvaal war. RAB., Mar.-Apr., p. 145.

Machine guns (*see also* Automatic guns):
  - Belgium: Note on purchase of Hotchkiss machine guns. IR., May, p. 177.
  - France:
    - Concerning the adoption of machine guns. RAG., May, p. 258.
    - Experiments with machine guns. RAG., Oct., p. 139.
    - Experiments with Hotchkiss machine guns. JDAM., Nov., p. 242.

Machine guns—Continued.

France—Continued.

The machine gun of the French infantry. (Discussion.) NMB., Aug. 15, p. 175.

The Hotchkiss machine gun. (Description and pl.) MGAGW., No. 6, p. 455.

Firing experiments between machine guns and rifles. MW., Mar. 9, p. 578; AE., p. 78.

Firing tests with machine guns; field machine guns. RAG., Mar., p. 414.

Instruction sur la mitrailleuse automatique Hotchkiss (modèle 1899). (Instructions concerning the Hotchkiss automatic machine gun, model 1899.) 18 pp., 1 pl. Paris, 1899.

Description of the Hotchkiss automatic machine gun (rifle caliber), model 1899. (Société Anonyme des Anciens Établissements Hotchkiss & Cie., Paris.) 17 pp., 12 pl. 1899.

Germany:

Maxim machine guns in service in the infantry. RA., Oct., p. 78.

Machine guns. (Notes on use, etc.) JDAM., July, p. 42; IR., Sup. 33, p. 982.

Machine gun detachment at the great autumn maneuvers of 1901. JDAM., Nov., p. 224.

Machine gun detachments. Clothing, equipment, armament. RMAE., July, p. 57.

The Bergmann machine gun, model 1901. (Description and pls.) KZ., No. 10, p. 555.

The machine and automatic guns of the *Iltis* (gunboat sent to China). (Ill.) MW., June 5, p. 1315.

Cartridges for machine guns. IR., Sup. 26, p. 763.

Exercises of chasseurs with machine guns. IR., Sup. 31, p. 918.

Machine gun detachments (organization, matériel, uniforms, etc.). JUSII, Oct., p. 348.

Assignment and command of machine gun detachments. RCM., Apr. 27, p. 461.

Great Britain:

Machine guns used in South Africa. JDAM., Oct., p. 106.

Note on Simpson machine gun. RCM., June 29, p. 687.

(India): New tripod mount for machine guns. JRUSI, Apr., p. 488.

(India): Maxim gun transport used by the 1st battalion, 4th Gurka rifles, suitable for country or ground impracticable for mules or wheeled carriages. (Ill.) JUSII, Apr., p. 131.

Tables of (1) small arms used in the British service; (2) small-arm and machine-gun ammunition in the British service; (3) machine guns in the British service; (4) swords and lances used in the British service (with plates). War office, Apr., 1900. 4 tables, 8 pl. London.

Netherlands: Aanwijzing op het gebruik van mitrailleurs M. '90 op drijvende stoelen tot mitrailleurs M. '90. (Instructions for the use of machine guns, model 1890, on floating carriages for said guns.) 22 pp. Breda, 1900.

Machine guns—Continued.

Norway: Extract from the report of Aug. 14, 1900, of the machine gun board. NAT., No. 1, p. 1 (appendix).

Russia:

Formation of five machine-gun companies. RA., Sept., p. 518; MW., June 15, p. 1404.

Note on use of machine guns in Russia. USM., Aug., p. 542.

Switzerland:

Organization of the mounted machine-gun companies. NMB., Mar. 1, p. 220.

Über die Verwendung der berittenen Maschinengewehr-Schützen-Kompagnien. Ihr Einfluss auf die Taktik der Kavallerie. (On the employment of mounted machine-gun companies. Their influence on cavalry tactics.) By Peter Sarasin, captain of cavalry, in command of machine gun company. 28 p 1 map. Basel, 1901.

Various:

Machine guns in warfare in the open field. IR., Sup. 22, p. 588.

Machine guns and cannon in field warfare. JDAM., Dec., p. 266.

Machine guns (in German and other armies). IR., Nov., p. 482.

Machine guns (organization, tactics, matériel, etc.). RAB., May-June, p. 123.

Des mitrailleuses et de leur emploi par l'infanterie dans l'offensive. (Machine guns and their employment by infantry in the offensive.) By Captain De Monbrison. 15 pp. Paris, 1901.

Machine guns in the army. (Notes on various systems, tactical employment, etc.) IMT., June, p. 444.

Madagascar:

Rapport d'ensemble sur la pacification, l'organisation et la colinisation de Madagascar. (Complete report on the pacification, organization, and colonization of Madagascar.) (Oct., 1896, to Mar., 1899.) By General Galliéni. 628 pp. Paris.

Manchuria (*see* Russia in China)

Maneuvers:

Austria:

The Austro-Hungarian maneuvers in 1900. RMAE., Mar., p. 247.

The imperial maneuvers in Hungary in 1901. (With map.) IR., Beih. 25, Dec., p. 1; RMS., Nov., p. 928.

Offensive maneuvers with real fire. RCM., Oct. 19, p. 416.

Belgium:

Army maneuvers in 1900. MW., Feb. 6, p. 337.

The army maneuvers of 1900. (With map.) IR., Beih. 18, p. 32.

France:

The army maneuvers of 1900. (With map.) IR., Beih. 16, p. 31.

The grand maneuvers in 1900. RI., Mar., p. 193.

The French army maneuvers of 1900. (Account.) NMB., Feb. 1, p. 97.

Maneuvers in Tonkin in 1900. IR., June, p. 240.

Comments on the army maneuvers in Beauce. 1900. RMS., Apr., p. 269

Maneuvers—Continued.

France—Continued.

French criticism of their own maneuvers in 1900. JDAM., Feb., p. 214.

The French army maneuvers of 1901. (Comments.) JDAM., Nov., p. 226.

French maneuver regulations for 1901. NMB., Aug. 1, p. 122; JRUSI., June, p. 776.

Autumn maneuvers. The exercises of a mixed brigade. RCM., Apr. 6. p. 378.

The grand maneuvers of 1901. (Account.) MW., Oct. 30, p. 2511.

The autumn maneuvers of 1901. (Notes on.) IR., Dec., p. 492.

At the grand maneuvers of the East. 1901. (Account with sketches.) RMS., Oct., p. 737.

Circulaire du 21 avril 1901 portant envoi de prescriptions générales pour les manœuvres. (Circular of April 21, 1901, promulgating general instructions for the maneuvers.) 17 pp. Paris.

Germany:

Organization, conduct, and employment of the cavalry at the imperial maneuvers of 1899 and 1900. IR., Beih. 18, p. 1.

The imperial German maneuvers in Pomerania in 1900. RAB., May-June, p. 114; JRUSI., Feb., p. 144.

Account of the imperial maneuvers in West Prussia in 1901. (With maps.) MW., Oct. 16, p. 2364; RMS., Jan., p. 17 (with map).

Machine-gun detachment, 8.7-cm. automatic gun, and automobiles at the 1901 autumn maneuvers. JDAM., Nov., p. 224.

Maneuver regulations in Germany. RMS., June, p. 444.

The regulations for the grand maneuvers. (*See* "The field-service regulations of the German army, 1900.")

Italy:

Program of maneuvers for 1901. JRUSI., Ap., p. 489.

The autumn maneuvers of 1901. (Note.) IR., Dec., p. 501.

Japan:

Notes on maneuvers in 1901. IR., Nov., p. 468.

Note on autumn maneuvers of 1900. IR., Mar., p. 104.

Maneuvers to be held in 1901. IR., May, p. 209.

Netherlands:

The autumn maneuvers of 1901. (Account with map.) RCM., Oct. 26, p. 463.

(India): Account of maneuvers (1901). (With pl.) IMT., Oct., p. 354.

Portugal: Autumn maneuvers in 1900. (Short account.) MW., Mar. 13, p. 601.

Russia:

The summer maneuvers of 1900. IR., Beih. 16, p. 1. (With map.)

The summer maneuvers of 1901. (Outline.) NMB., June 1, p. 518.

Maneuvers—Continued.
  Russia—Continued.
    This year's (1901) grand maneuvers in St. Petersburg military district. MW., Oct. 2, p. 2270.
    The marching maneuvers in the Russian army. RMAE., Oct., p. 279.
    The great Russian imperial maneuvers in the Wyborg-Petersburg-Rewal rayon. (With sketches.) IR., Beih. 23, Nov., 1901.
  Switzerland:
    Autumn maneuvers of 1900. MW., Apr. 3. p. 798.
    The maneuvers of 1901. (Account with maps.) RCM., Nov. 30, p. 579.
    The mountain maneuvers in Switzerland. RMI., June, p. 1105.
    Account of mountain maneuvers. (Ill.) RMS., Oct., p. 824.

Mannlicher:
  Repetier- und automatische Handfeuerwaffen der Systeme Ferdinand Ritter von Mannlicher. (Mannlicher's repeating and automatic small arms.) By Konrad Edler von Kromar, colonel. 16 pp., 37 pl. Wien, 1900.

Mannlicher-Schönauer rifle:
  Description and plates. MGAGW., No. 10, p. 716.

Maps:
  Cartes étrangères. Notions et signes conventionnels. (Foreign maps. Notions and conventional signs.) By Captain Espérandieu. 140 pp. Paris (no date).

Marga:
  Short description of the Marga rifle. RA., Aug., p. 361.

Mars automatic pistol. (Ill.) E., Dec. 6, p. 578; AE., Dec., p. 190 (ill.).

Martini-Francotte rifle:
  Belgium: Short description, with figs. RA., Aug., p. 362.

Meat biscuit:
  Russia: Meat biscuit for soldiers. KZ., No. 4, p. 213.

Meat, canned:
  France: Cahier des charges du 6 août 1900 pour la fourniture des conserves de viandes françaises ou coloniales. (Specifications of August 6, 1900, for the furnishing of canned meat, both French and colonial.) 34 pp. Paris.

Meat, supply of:
  France: Instruction sur l'alimentation et le ravitaillement en viande des troupes en campagne. (Instruction on the supply and replenishment of meat for troops in the field.) Mar. 18, 1901. 121 pp. Paris.

Mechanical traction (*see* Automobiles).

Medals:
  Great Britain: Official medals and ribbons of the British army, 1800 to present day. Showing both sides of 48 different medals. London.

Medical equipment:
  France: Matériel de la boulangerie militaire et appareils du service de santé destinés aux troupes en campagne. (Military baking outfit and medical apparatus for troops in the field.) 19 pp., 15 pls. Paris (Société Industrielle de Creil).

Medical schools:
- Austria: Organization of a school of application of military medical service. RMAE., Jan., p. 83.

Medical service (*see also* Diseases):
- France:
  - Règlement sur le service de santé de l'armée à l'intérieur. (Regulations on the interior medical service of the army.) Corrected up to July, 1900. 492 pp. Paris.
  - Service de Santé. Dispositions diverses. (Medical service. Various regulations.) (Bulletin officiel du ministère de la guerre.) Corrected up to July 1, 1900. Paris.
- Service de santé. Instruction du 5 mai 1899 sur l'utilisation en temps de guerre des resources du territoire national pour l'hospitalisation des malades et des blessés de l'armée. (Medical service. Instructions of May 5, 1899, on the utilization in time of war of the resources of the national territory for the care in hospitals of the sick and wounded of the army.) (Bulletin officiel du ministère de la guerre.) 337 pp. Paris, 1899.
- Germany:
  - Our medical service before the enemy. MW., Sept. 14, p. 2099.
  - Concerning field sanitary service. MW., Oct. 26, p. 2491.
- Great Britain:
  - Scheme for reorganizing the army medical services. JRUSI., Oct., p. 1262.
  - Army medical reform. Its history and its future. USM., June, p. 299.
  - The army sanitary service in peace and war. USM., Dec., p. 276.
  - Some medico-military war lessons. USM., May, p. 186.
  - A simple method of training in medical field services. JUSII., Jan., p. 63.
  - Regulations for army medical services, 1900. vii, 236 pp. London.
  - Army medical department report for the year 1899. Vol. XLI. vii, 347 pp. London, 1901.
  - Report of the committee appointed by the secretary of state to consider the reorganization of the army medical services. 12 pp. London, 1901.
  - (India): Report on sanitary measures in India in 1899–1900. Vol. XXXIII. 262 pp. London, 1901.
- South Africa: The Boers' medical arrangements during the war. JUSII., Apr., p. 134.
- Switzerland: Schweizerische Armee. Sanitätsdienstordnung. (Medical service regulations of the Swiss army. Sections I–V. 1901.) xv, 172 pp. (No place) 1901.
- Various: Organization of voluntary medical aid in war in Austria, France, and Germany. 1901. Edited in the intelligence division of the war office by Maj. J. E. Edmonds, R. E., D. A. A. G. 63 pp., 2 pl.

Medical statistics:

France:

Medical statistics of the French army in 1898. RCM., Mar. 9, p. 261.

Statistique médicale de l'armée pendant l'année 1898. (Medical statistics for the army during 1898.) 471 pp. Paris, 1900.

Instruction pour l'établissement de la statistique médicale de l'armée. (Instructions for the establishment of medical statistics of the army.) Brought up to date. 96 pp. Paris, 1901.

Mexico:

The army system of Mexico. NMB., Feb. 15, p. 145.

The army system of Mexico. MW., Sept. 11, p. 2085; translation: JRUSI., Oct., p. 1275.

Memoria de la secretaria de estado y del despacho de guerra y marina presentada al congreso de la union. (Report of the state, war, and navy department to congress.) Vol. I. 378 pp. Mexico, 1901. (Contains new army organization.)

Military justice:

France:

Modifications in the code of military justice. RCM., July 27, p. 125.

Projet de loi portant réforme du code de justice militaire pour l'armée de terre. (Bill to reorganize the code of military justice for the army.) 155 pp. Paris, 1901.

Militia:

Canada:

Department of militia and defense for the Dominion of Canada. Report for the year ended December, 1900. 64 pp. Ottawa, 1901.

The Canadian militia system and its applicability to our requirements at home. (Selected papers Canadian Military Institute.) 1900. Welland, Ont. *See also* JRUSI., Apr., p. 51.

Mines:

Various:

On defense by countermines. RGM., Aug., p. 165.

Employment of mines in attack and defense of places. (By Brialmont.) RAB., Jan.-Feb., p. 5.

Mining:

Great Britain: Instruction in military engineering. Part IV. Mining and demolitions. Compiled at the school of military engineering, Chatham. 5th edition. 1900. x, 142 pp., 34 pl. London, 1900.

Miscellaneous:

Various: v. Löbell's Jahresberichte über die Veränderungen und Fortschritte im Militärwesen. (Von Löbell's reports on the changes and progress in military matters.) 1900. xiv, 651 pp. Berlin. (Précis of same: JRUSI., Oct., p. 1183.)

Mitrailleuses (*see* Machine guns).

Montenegro:

Armed forces, armament, etc. MW., Aug. 17, p. 1877; IR., May, p. 210.

Motor field battery. PRAI., Jan., p. 509.

Motorcycles:

Norway: Report on experiments with 3-wheeled motorcycle. (Ill.) NAT., No. 3, p. 18 (appendix).

Mountain artillery:

Germany: The mountain batteries in China. IR., Sup. 29, p. 823.

Great Britain: No. 4 mountain battery in the Boer war. PRAI., Feb., p. 583.

Italy: Artillery for mountain troops. (Discussion.) RMI., Apr., p. 595.

Switzerland: Règlement d'exercice pour l'artillerie de montagne suisse. (Drill regulations for Swiss mountain artillery.) Adopted by the Federal Council Feb. 13, 1900. xi, 224 pp. Berne, 1900.

Mountain guns:

France: Description of mountain guns at the St. Chamond exhibit at the Paris Exposition of 1900. (Ill.) RA., June, p. 197.

Germany: The Krupp 7.5 cm. rapid-fire mountain gun with long recoil. Model 1901. (Description, data, pls., etc.) RMS., Nov., p. 865.

Great Britain:

The Vickers-Maxim mountain gun. (Ill.) RA., Feb., p. 379.

Note on armament of Indian mountain artillery. MW., Sept. 28, p. 2348.

Note on 75-mm. Vickers-Maxim mountain gun. Eg., Mar. 8, p. 300.

Mounted infantry:

Great Britain:

Organization, equipment, and instruction of the mounted infantry in South Africa. IR., May, p. 202.

Notes on mounted infantry. JUSII., Oct., p. 253.

Russia:

New instructions for mounted infantry. (Text.) JRUSI., July, p. 901.

The mounted infantry in Russia. RCM., June 22, p. 658.

Various:

Mounted infantry (especially in Boer war). MW., Mar. 6, p. 535.

Cavalry or mounted infantry? JSM., Mar., p. 419.

The fifth arm (mounted infantry). RCM., May 25, p. 549.

Mules:

Various: Zucht und Remontirung der Militärpferde aller Staaten. (Breeding of military horses and remount service in all countries.) By Dr. Paul Goldbeck, veterinary surgeon in the 2d Brandenburg uhlan regiment. ix, 415 pp. Berlin, 1901.

Musketry instruction (*see* Firing instruction, Target practice, etc.).

Naval guns:

Turkey: Purchase of 208 Krupp guns for armament of ironclads. RA., Sept., p. 80.

Great Britain: Naval ordnance. (Ill.) Eg., Aug. 2, p. 145.

Naval war game (*see* War game).

Navies:
  Various:
    All the world's fighting ships. Cosmopolitan naval annual, target book, and sign manual. Founded and edited by Fred T. Jane. 396 pp.; illustrated. London, 1901.
    The naval annual, 1901. Ed. by John Leyland. vi, 515 pp.; illustrations, charts, tables. Portsmouth, 1901.
    The naval pocketbook founded by W. Laird Clowes, ed. by L. G. Carr Laughton, with numerous plans. Corrected to March, 1901. 880 pp., drawings.

New Zealand:
  The New Zealand official yearbook, 1900. (Ninth year of issue.) Prepared under instructions from the Right Honorable R. J. Seddon, P. C., premier, by E. J. von Dadelszen, registrar general. vii, 648 pp.; tables, ills. Wellington (no date).

Night exercises:
  Germany: On the value of night exercises. Lecture. JDAM., Jan., p. 38.

Nordenfelt:
  Belgium: Nordenfelt quick-firing field artillery. (Ill.) Eg., Mar. 1, p. 259.

Nordenfelt-Cockerill:
  The Nordenfelt-Cockerill rapid-fire field gun. (A study.) KZ., No. 1, p. 36; RAB., May–June, p. 5; SMB., Feb., p. 52.

Obstructions:
  Various:
    Value and arrangement of river obstructions. MGAGW., No. 6, p. 431.
    River obstructions. RGM., Aug., p. 161.

Optical instruments:
  Various: Officers' optical equipment. (Ill.) NAT., No. 1, p. 1.

Optical telegraphy:
  Various: Optical telegraphy in war. KZ., No. 8, p. 430.

Ordnance board:
  Spain: Creation of a technical artillery commission. RCM., Oct. 26, p. 467.

Ordnance matériel (*see also* separate heads):
  Argentina: Notes on the field artillery matériel. RAG., Feb., p. 258.
  Austria:
    Review of experiments with ordnance and small arms in 1899 and 1900. MGAGW., No. 5, p. 345.
    Note on rapid-fire guns, howitzers, etc., given to troops for experiment. MW., Mar. 13, p. 603.
    Spécification du matériel de guerre fabriqué ou en voie de construction dans les ateliers militaires techniques des usines Skoda. (Specifications of the war material manufactured or in the course of construction in the technical military workshops of the Skoda factories.) 11 pp. (No place, no date.)
    L'artillerie Skoda à l'exposition universelle de 1900. (The Skoda artillery at the Paris Exposition of 1900.) By M. C. Curey, captain of artillery. (Extract from the Revue d'Artillerie, November, 1900.) 32 pp., 16 figs., 3 pl. Paris–Nancy, 1900.

Ordnance matériel—Continued.

France:

Société anonyme des anciens établissements Hotchkiss et Cie., Paris. Catalogue du matériel de la guerre. (Catalogue of war material.) 46 pp.; illustrated. Paris, 1900.

Exposition Universelle de 1900. Schneider et Cie. Catalogue des objets exposés. (Paris Exposition, 1900. Schneider & Co. Catalogue of exhibits.) 166 pp.; illustrated. Paris, 1900.

Artillerie. Système Darmancier & Dalzon. (Ordnance. System Darmancier & Dalzon.) Compagnie des forges et aciéries de la marine et des chemins de fer. (Mountain, landing, field, siege, and fortress, seacoast and naval artillery, and armored turrets and casemates.) 106 pl. St. Chamond, 1900.

The works of Messrs. Schneider and Co. By James Dredge, C. M. G. Partly reproduced from "Engineering." xviii, 360 pp.; illustrated. London, 1900.

Germany: New 10.5-cm. gun for foot artillery. MA., Sept., p. 306.

Great Britain:

Ordnance material used in South Africa. RA., Mar., p. 548.

Modern British ordnance. (Ill.) SA., Apr. 20, p. 248.

Treatise on service ordnance. 5th edition. 1900. 669 pp., 128 pl. London.

Russia: L'artillerie russe à l'exposition universelle de 1900. (The Russian artillery at the Paris Exposition of 1900) By M. C. Curey, captain of artillery. (Extract from the Revue d'Artillerie, September, 1900) 42 pp., 2 pls., 46 figs. Paris–Nancy, 1900.

Spain: Artillería de sitio, plaza y costa. Descripción de los materiales reglamentarios de España. (Siege, garrison, and seacoast artillery. Description of the regulation material in Spain.) By José de Lossada y Canterac, major of artillery. 2 vols., text and atlas. v, 214 pp., 30 pl. Segovia, 1900.

Various:

Notes on status of field gun, howitzer, etc., question in several countries. JDAM., Sept., p. 306 et seq.

Modern artillery. (Ill.) Eg., Mar. 8, p. 297.

Waffenlehre. (Ordnance and gunnery.) By Maj. Gen. R. Wille. 2d edition. xii, 968 pp., 859 figs., 8 pl. Berlin, 1901.

Ordnance services:

Great Britain: Regulations for army ordnance services. 1900. vi, 288 pp. London.

Organization (*see also* Budgets):

Argentina: Army reorganization bill. IR., Mar., p. 81; Aug., p. 329.

Austria:

The effective peace and war strength of the army. RMI., Sept., p. 1674.

Reorganization of the train. IR., Feb., p. 66.

Changes according to budget for 1902. RCM., Nov. 2, p. 489.

Übersichts-Karte der Dislokation des k. u. k. österr.-ung. Heeres und der Landwehren im Jahre 1900–1901. (Map showing the distribution of the Austro-Hungarian army and landwehrs in the year 1900–1901.) Wien.

Organization—Continued.

Balkan States: Handbook of the armies of the Balkan States. 1900. Prepared in the intelligence division, war office, by Capt. M. C. P. Ward, R. A., staff captain. 107 pp., 1 map. London, 1900.

Belgium: Report of commission on army reorganization. RMI., June, p. 1112.

Bulgaria: Military reforms in Bulgaria, 1899 and 1900. RMAE., Jan., p. 67.

China: Die chinesische Armee und Kriegsflotte. (The Chinese army and navy.) 19 pp. Berlin, 1900.

France:

Composition of army according to budget for 1902. IR., Aug., p. 334.

Manuel do l'organisation de l'armée et du fonctionnement des services militaires à l'usage des états-majors, chefs de corps et officiers de toutes armes. (Manual of the organization of the army and of the workings of the military departments, for the use of staffs, commanders, and officers of all arms.) By Ch. Lassalle, archivist of the general staff. 2d edition, entirely revised and enlarged. xxii, 1629 pp. Paris-Nancy, 1899.

Carte de la répartition et de l'emplacement des troupes de l'armée française pour l'année 1901. (Map of the distribution and stations of the troops of the French army for 1901.) 32 pp., 1 map. Paris, 1901.

Extracto de organización militar de los ejercitos extranjeros. Según datos existentes en el depósito de la guerra. Francia. (Summary of the military organization of foreign armies. According to data on hand in the general staff bureau. France.) 449 pp., 1 map. Madrid, 1901.

Handbook of the French army. Prepared in the intelligence division of the war office. Revised by Maj. N. W. Barnardiston, Middlesex Regt., D. A. A. G. 184 pp., 1 pl. London, 1901.

Germany:

New formations and effective according to budget for 1901. RMAE., Aug., p. 102; USM., Nov., p. 204.

Die Heere und Flotten der Gegenwart. (The armies and navies of the present.) Founded by J. v. Pflugk-Harttung; published by E. von Zepelin, major general. I. Deutschland. (Germany.) The army, by A. von Boguslawski, lieutenant general. The navy, by R. Aschenborn, rear admiral. Anhang: Das internationale rothe Kreuz. (Appendix: The international red cross.) By Maj. O. von Strantz. 2d edition, including changes up to January, 1900. xix, 596, 128 pp. Berlin, 1900.

Neueste Armee-Eintheilung. Vollständige Übersicht und Unterkunftsliste des gesammten deutschen Reichsheeres, der kaiserlichen Marine und des ostasiatischen Expeditionskorps. (Latest army distribution list. Complete synopsis and station list of the German army, navy, and the eastern Asiatic expeditionary corps.) 87 pp., 3 pl. Berlin, 1901.

Organization—Continued.

Germany—Continued.

Neueste Armee-Karte. Übersicht der Korpsbezirke mit den Standorten des gesamten deutschen Reichsheeres und der kaiserlichen Marine unter Angabe ihrer Truppentheile, der Bezirkskommandos, Truppenübungsplätze u. s. w. (Latest army map, showing the corps districts and stations of the whole German army and navy, and giving the troop units, recruiting headquarters, drill grounds, etc.) Berlin, 1901.

Das kleine Buch vom deutschen Heere. Ein Hand- und Nachschlagebuch zur Belehrung über die deutsche Kriegsmacht. (The small book of the German army. A handbook and book of reference on the German military forces.) Prepared from the latest regulations by 1st Lieutenant Hein. xiii, 348 pp., 400 figs., 17 pl. Kiel und Leipzig, 1901.

Handbook of the German army (home and colonial). Second edition. Revised in the intelligence division of the war office by Maj. J. E. Edmonds, R. E., D. A. A. G. London, 1901.

Great Britain:

The English army reorganization. MW., Aug. 14, p. 1851; IR., May, p. 200.

The English army and its reorganization. NMB., June 1, p. 481.

England's danger. The future of British army reform. By Theodor von Sosnosky. Translated by M. Sinclair. xx, 275 pp.; maps and tables. London, 1901.

Regimental establishments of the regular forces and the militia for 1901-1902. 51 pp. London, 1901.

Italy:

Strength and composition of army on July 1, 1900. JDAM., Dec., p. 367.

Composition and effective strength of army according to budget for 1901-2. IR., Mar., p. 99.

Japan: Notes on organization, strength, etc. RAB., Mar.-Apr., p. 147; IR., Mar., p. 103; Apr., p. 147.

Mexico:

The organization of the Mexican army. MW., Sept. 11, p. 2085; JRUSI, p. 1275; NMB., Feb. 15, p. 145.

Memoria de la secretaria de estado y del despacho de guerra y marina presentada al congreso de la union. (Report of the state, war, and navy department to congress.) Vol. I. 378 pp. Mexico, 1901. (Contains new army organization.)

Netherlands:

New law on recruiting and organization. JRUSI., July, p. 898.

The new army law. MW., July 6, p. 1575.

Present composition of the Dutch army. RCM., Apr. 6, p. 387.

Norway: Handbook of the armies of Sweden and Norway. Prepared in the intelligence division of the war office by Maj. J. H. V. Crowe, R. A., staff captain. 122 pp., 5 pl. London, 1901.

Persia: The Persian army. NMB., Apr. 1, p. 322.

Peru:

Organization of the army. MA., July, p. 98.

Note on military organization. MW., Jan. 23, p. 259; IR., Mar., p. 106.

Organization—Continued.

Roumania:

Organization of the infantry. IR., Jan., p. 25.

L'armée roumaine en 1900. (The Roumanian army in 1900.) Notes published for the Paris Exposition by the Roumanian military committee. vii, 344 pp. Angers, 1900.

Russia:

Changes in the organization of the troops of the Amur district. RMAE., Mar., p. 279; Creation of a reserve battalion and transformation of a frontier battalion in Siberia. Idem, p. 284.

Organization of the Cossack troops of the Transbaikal. RMAE., May, p. 440; change in organization of troops in Turkestan. Idem, p. 441.

Changes in organization of troops in European Russia. RMAE., July, p. 59.

Puissance militaire de la Russie. Apperçu succinct. (Military power of Russia. Brief summary.) By J. Mikouline, lieutenant colonel of the general staff. 130 pp. St. Petersburg, 1900.

Eintheilung und Dislokation der russischen Armee nebst einem Verzeichnisse der Kriegsschiffe. (Distribution and stations of the Russian army, with a list of war vessels.) 55 pp. Leipzig, 1901.

Servia: Changes in organization of Servian army. RMAE., Oct., p. 284.

Spain: Note on composition of army in 1901. IR., Apr., p. 166; RCM., Feb. 9, p. 165.

Sweden:

The new recruiting system and army organization. MW., Sept. 14, p. 2107.

The new army organization. NMB., Feb. 1, p. 133; RMI., May, p. 940.

Military reorganization in Sweden. NMB., Aug. 15, p. 187.

Military reform in Sweden according to the new army bill. MW., Mar. 2, p. 524.

Handbook of the armies of Sweden and Norway. Prepared in the intelligence division of the war office by Maj. J. H. V. Crowe, R. A., staff captain. 122 pp., 5 pl. London, 1901.

Switzerland:

Eintheilung der Schweizerischen Armee nebst Verzeichniss des Instruktionspersonals, Tableau der Militär-Schulen pro 1900 und dienstlichen Notizformularien. (Distribution of the Swiss army, with a list of the instructional personnel, table of the military schools for 1900, and blank service forms for reports.) 74 pp. Frauenfeld, 1900.

L'armée suisse. (The Swiss army.) By Col. J. Feiss. 3d edition, thoroughly revised. French edition by Alf. Adeoud, lieutenant colonel. 306 pp. Zurich, 1896.

Turkey: Handbook of the Turkish army. Prepared in the intelligence division of the war office, by Capt. M. C. P. Ward, R. A., staff captain. 1900. 48 pp., 1 map. London.

Organization—Continued.

Venezuela: The army system of Venezuela. JDAM., May, p. 208.

Various: The statesman's yearbook, 1900. xliv, 1320 pp., 5 maps. London, 1901.

Pack transportation:

Manual of instruction in pack transportation. By H. W. Daly, packmaster, U. S. Army. viii, 78 pp. West Point, 1901.

Panoramic sketches, employment of, in the field and in reconnoissances. (Ill.) JSM., Sept., p. 426.

Patriotic fund:

Great Britain:

Royal patriotic fund. Return of account of moneys paid, etc. 97 pp. London, 1901.

Thirty-ninth report of the royal commissioners of the patriotic fund to His Majesty the King. 53 pp. London, 1901.

Patrols:

Various: The training of artillery patrols. PRAI., Sept.-Oct., p. 309.

Pay:

France:

Décret du 29 mai 1890 portant règlement sur la solde et les revues. (Decree of May 29, 1890, promulgating regulations on pay and reviews.) Corrected up to May, 1901. 258 pp. Paris.

Tarifs de solde de l'armée française. (Pay tables of the French army.) Decree of Dec. 27, 1890. 9th edition, corrected to May, 1901. 159 pp. Paris.

Germany: Friedens-Besoldungs-Etats der preussischen und der in die preussische Verwaltung übernommenen Truppen etc., gültig vom 1. April 1898 ab. (Peace pay tables of Prussian troops, and of troops, etc., included under the Prussian administration; in force from April 1, 1901.) 220 pp. Berlin, 1901.

Great Britain:

Increase in the pay of the yeomanry. RMAE., May, p. 435.

Royal warrant for the pay, appointment, promotion, and noneffective pay of the army, 1900. viii, 415 pp. London, 1900

Persia:

The Persian army. NMB., Apr. 1, p. 322.

Peru:

Note on military organization. MW., Jan. 23, p. 259.

Organization of the army. MA., July, p. 98; IR., Mar., p. 106.

Petards:

Mexico: Cavalry provided with. JRUSI., Mar., p. 360.

Photography:

Various: Photography and its military application. MS., Dec., p. 907.

Pieper:

Description of Pieper revolver and repeating rifle. (Ill.) RA., Aug., p. 383.

Pigeons:

France:

The military carrier-pigeon service in France. KZ., No. 5, p. 252.

Training of French cavalry in carrier-pigeon service. KZ., No. 10, p. 564.

Pigeons—Continued.

France—Continued.

On the employment of carrier pigeons. IR., Jan., p. 11; Mar., p. 93; Oct., p. 413.

Russia: Use of carrier pigeons at maneuvers. IR., Dec., p. 512.

Various:

The homing or carrier pigeon in warfare. USM., Feb., p. 528.

The employment of carrier pigeons for military purposes in various countries. NMB., Apr. 1, p. 307.

Le pigeon voyageur dans le service d'exploration. (The carrier pigeon in the service of exploration.) By Gen. Paul de Benoist. 136 pp., 12 figs. Paris, 1900.

Pioneers:

Austria: The Austro-Hungarian pioneer troops in 1901. SMB., Sept., p. 360.

Germany: Pioneers in field warfare. MW., July 31, p. 1746.

Pistols:

Austria:

Note on experiments with automatic pistols. JDAM., Sept., p. 309.

Note on pistol adopted for army. RAG., Jan., p. 129.

New patent magazine pistol mechanism (Fortelka & Leitner). AE., Aug., p. 131.

Repetier- und automatische Handfeuerwaffen der Systeme Ferdinand Ritter von Mannlicher. (Mannlicher's repeating and automatic small arms—rifles and pistols.) By Col. Konrad Edler von Kromar. 16 pp., 37 pl. Wien, 1900.

Belgium:

Repeating pistol of the Francotte factory. (Ill.) RA., Aug., p. 367.

Browning pistol adopted by Belgian government. (Short description and plate.) RA., Aug., p. 371.

Note on Browning pistol adopted for army. JDAM., Sept., p. 303.

The Browning automatic repeating pistol. (Description, ballistic data, plates.) KZ., No. 6, p. 281.

Note on modified Browning automatic pistol. AE., Nov., p. 172.

Germany: Bergmann's Rückstosslader. (Bergmann's automatic pistols.) By Dr. Reinhold Günther, captain in the Federal rifle battalion. 93 pp., 3 pl. Berlin, 1900.

Great Britain: A new automatic pistol (Mars). E., Dec. 6, p. 578; AE., Dec., p. 190 (ill).

Switzerland:

Note on Lueger repeating pistol adopted for army. JDAM., Sept., p. 301.

Note on new revolver (pistol) for mounted troops, model 1900. MW., May 29, p. 1280.

The new model 1900 pistol for mounted troops. (With numerical data.) RAG., June, p. 424.

- Pistols—Continued.
  - Various:
    - Development of revolvers and pistols. (Description of various models of revolvers and automatic pistols.) KZ., No. 1, p. 1.
    - Armament with automatic pistols (those adopted or tested in various countries). KZ., No. 10, p. 562.
    - A few more words on automatic pistols. RAB., May–June, p. 133.
- Plastomenite:
  - Étude sur la plastoménite: Nouvelle poudre pour canons et fusils. (A study on plastomenite, a new powder for cannon and small arms.) By Maj. Gen. R. Wille. Translated by Capt. G. Bodenhorst, of the Belgian army. 134 pp., 9 pl., 1 sketch. Berlin, 1898.
- Police:
  - Canada: Report of the northwest mounted police, 1900. Paged separately. Ottawa, 1901.
  - Philippines: Handbook Philippines constabulary.
- Pompoms (*see* Automatic guns).
- Position artillery (*see* Heavy artillery).
- Postal service:
  - Switzerland: Field post-office regulations. SMB., July, p. 347.
- Powders and explosives:
  - France: Nitro explosives. (Note.) Eg., Sept. 27, p. 457.
  - Germany: Étude sur la plastoménite: Nouvelle poudre pour canons et fusils. (A study on plastomenite, a new powder for cannon and small arms.) By Maj. Gen. R. Wille. Translated by Capt. G. Bodenhorst, of the Belgian army. 184 pp., 9 pl., 1 sketch. Berlin, 1898.
  - Great Britain:
    - Cordite and lyddite. RAG., Mar., p. 377.
    - The cordite of to-day. AE., May, p. 67.
    - Cordite. (Notes on erosion, etc.) IR., Sup. 24, Mar., p. 665.
    - High explosive shells. Eg., Aug. 2, p. 156; Aug. 9, p. 195.
    - Treatise on service explosives. 1900. vii, 133 pp. London.
    - Nobel's high explosives: 1st—for mining and general blasting purposes; 2d—for naval, military, and sporting ammunition. 154 pp.; illustrated. Glasgow (1901).
    - Twenty-fifth annual report of Her Majesty's inspectors of explosives; being their annual report for the year 1900. 210 pp. London, 1901.
  - Sweden: The development of smokeless powder. Eg., July 5, p. 25.
  - United States: The development of smokeless powder in the United States. Eg., May 31, p. 690.
  - Various:
    - Table showing rifles and powders used in various countries. MW., Mar. 23, p. 675.
    - Powders used in various countries. RAG., Feb., p. 271.
    - Study on the new powders. RAB., Jan.–Feb., p. 73.
    - Notes on high (brisant) explosives. SM., May 1, p. 205.
    - Contribution to the study of explosives. RMI., June, p. 1042.

Powders and explosives—Continued.
  Various—Continued.
    Smokeless powders: Cordite *vs.* nitrocellulose. Eg., Mar. 8, p. 297.
    Smokeless powder. Eg., Mar. 15, p. 345.
    Waffenlehre. (Ordnance and gunnery.) By Wille. Berlin, 1901.
    Smokeless powder, nitrocellulose, and theory of the cellulose molecule. By John H. Bernadou, lieutenant, U. S. N. 200 pp. New York, 1901.
Pozzuoli-Armstrong tubes. KZ., No. 3, p. 136.
Prisons:
  Great Britain: Report on the discipline and management of military prisons, 1900. By Lieut. Col. M. Clare Garsia, inspector general of military prisons, etc. 83 pp. London, 1901.
Provisioning:
  France: 1° Instruction sur l'alimentation en campagne (14 juin 1900); 2° Instruction sur l'alimentation dans les centres de mobilisation (15 juin 1900). (1st. Instructions for provisioning in the field, of June 14, 1900; 2d. Instructions for provisioning in mobilization centers, of June 15, 1900.) (Bulletin officiel du ministère de la guerre.) 61 pp. Paris.
Quadrants:
  Italy: Study of a spirit-level quadrant for siege artillery. (With pl.) RAG., Nov., p. 234.
Railroads (*see also* Transportation):
  Canada: Annual report of the department of railways and canals for the fiscal year from July 1, 1899, to June 30, 1900. xliv, 259 pp.; maps, etc. Ottawa, 1901.
  Germany:
    Organization of the military railroad. RMAE., Aug., p. 136; JRUSI., p. 1144.
    Order concerning conveyance of troops by rail in case of mobilization. USM., Sept., p. 651.
    Provisions relative to the operation and administration of the military railroad. RAG., Oct., p. 183.
  Great Britain:
    (India): The use of light railways in Indian warfare and the organization and working of railway corps. JUSII, Jan., p. 15.
    Some notes on guns on railway mountings. JUSII., Oct., p. 318.
  Russia:
    Creation of two new railroad companies. RCM., Nov. 30, p. 589.
    The military importance of the Siberian railroad. IR., Sup. 22, Jan., p. 598.
    The efficiency of the Russian railroads, especially in war time. IR., Sup. 24, Mar., p. 635.
    Proposed construction of a great strategic railroad. IR., Dec., p. 509.
    The Russo-Asiatic railroads and their military significance. KZ, No. 5, p. 225.
    The Russian railroad of Central Asia. RAG., Jan., p. 137.

Railroads—Continued.

Russia—Continued.

Russland in Asien. Band III. (Russia in Asia. Volume III.)

Sibirien und die grosse sibirische Eisenbahn. (Siberia and the great Siberian railway.) By Major General Krahmer. 2d, improved and fully revised edition. vi, 286 pp., 2 maps. Leipzig, 1900.

The great Siberian railway. Edited by the chancery of the committee of ministers. 16 pp., 1 map. St. Petersburg, 1900.

Russland in Asien. (Russia in Asia.)

Vol. I. Transkaspien und seine Eisenbahn. (Trans-Caspia and its railroad.) Prepared from documents of the constructor, Lieut. Gen. M. Annenkow, by Dr. O. Heyfelder. x, 159 pp., 1 map; illustrated. Leipzig, 1889.

Guide du grand chemin de fer trans-sibérien. (Guide of the great trans-Siberian railroad.) Published by the department of communications. Edited by A. I. Dmitrief-Mamonof and Engineer A. F. Zdsiarsky. Translated by P. Tacchella. viii, 572 pp., 2 phototypes, 363 photo-engravings, 4 maps of Siberia, 3 plans of cities. St. Pétersbourg, 1900.

Range finders:

France: Study of the terrain with the aid of a range-finding instrument. (Description and pls. of Aubry range finder.) RA., Sept., p. 437.

Germany:

A new range finder. (Ill.) KZ., No. 9, p. 494.

Concerning range finders. MW., Apr. 17, p. 884; May 18, p. 1149.

A range-finding cannon. MW., Apr. 20, p. 950.

Great Britain:

A new range finder and follower, invented by Burns and Baker. JRUSI, Jan., p. 94.

Barr & Stroud's range finder for field artillery (in Boer war). NAT., No. 1, p. 39.

Test of a new range finder by Prof. Forbes. SMB., Oct., p. 420; SA., Aug., p. 122; Oct., p. 261.

Proposed experiments with Giletta's acoustic telemeter. SA., Sept. 28, p. 199.

Italy:

The Braccialini range finder. KZ., No. 7, p. 367.

An instrument (square) for calculating ranges. RAG., Aug., p. 243.

New range finder (Giletta's). IR., Oct., p. 427; RMS., Oct., p. 864; RMS., Oct., p. 864.

Various:

Range finders for field use. NAT., No. 2, p. 63.

A new telemetric and topographic instrument. (Ill.) RMS., July, p. 505.

Range-indicator dial, suggested battery commander's. PRAI., Sept.-Oct., p. 289.

Range tables:

Various: The compilation of range tables. PRAI., July-Aug., p. 149.

Rapid-fire field guns:

Austria:

The question of the metal of the new field guns. IR., Sup. 28, p. 816.

Tests with various rapid-fire field guns. IR., Nov., p. 472; USM., Dec., p. 315.

The new artillery matériel. MA., Oct., p. 415.

The problem of the new field gun. RAG., Jan., p. 99.

Concerning the new rapid-fire guns. RAG., Apr., p. 184.

Trials of new rapid-fire field guns. AE., Aug., p. 119.

Die Skoda'schen Schnellfeuer Feldgeschütze, M. 1900, in drei Systemen: Rohrrücklauf, einfacher Drehsporn, langer Sporn. (The Skoda rapid-fire field guns, M. 1900, in three systems, viz, recoil on carriage, simple rotating spade, and long spade.) 18 pp., 12 pl. Pilsen, 1901.

Belgium:

Conversion of the model 1878 Krupp field gun into an accelerated-fire gun. RAG., July–Aug., p. 146.

The Nordenfelt-Cockerill rapid-fire field gun. (A study.) KZ., No. 1, p. 36; SMB., Feb., p. 52.

Nordenfelt 75-mm. field artillery. (Ill.) Eg, Mar. 1, p. 260.

Tests with Cockerill-Nordenfelt 7.5-cm. field gun. JDAM., Dec., p. 363.

Conversion of field guns into rapid-fire guns. (Short note.) JDAM., Sept., p. 315.

A few words on the Cockerill-Nordenfelt field guns. RAB., Jan.–Feb., p. 115.

The Nordenfelt-Cockerill rapid-fire field guns. RAB., May–June, p. 5.

7.5-cm. rapid-fire field artillery tested by the 26th mounted battery. (Lecture.) RAB., July–Aug., p. 79.

France:

Note on rapid-fire field gun, with reference to Deport gun. JDAM., Dec., p. 362.

The French rapid-fire artillery in battle. IR., Sup. 32, p. 932.

Notes on the rapid-fire field artillery. (Ill.) RAG., Mar., p. 371.

Observations on the employment of the field artillery. RAG., Jan., p. 109.

Defects of the French field gun. SMB., Oct., p. 419.

The employment of the French rapid-fire artillery in the provisional infantry drill regulations (Vol. III, Title XII). JDAM., Sept., p. 267.

Notes on new French field artillery matériel. MW., Apr. 6, p. 827.

Notes on the new French field gun. MW., May 4, p. 1045.

Note on new rapid-fire field gun. MW., Sept. 4, p. 2023.

Improvement on the French field gun by Captain Ravon. MW., Nov. 27, p. 2766; JDAM., Dec., p. 359.

Some information on the new field gun. RAB., July–Aug., p. 110.

Rapid-fire field guns—Continued.

France—Continued.

Notes taken by a Spanish officer of the French rapid-fire field gun at the maneuvers. JRUSI., Oct., p. 1274.

The fighting of the French field artillery. SMB., Mar., p. 131.

Schneider-Canet guns. (With pls.) SMB., June, p. 233; MA., Sept., p. 267.

Darmancier & Dalzon 75-mm. field gun. Eg., Mar. 29, p. 397.

Schneider-Canet quick-firing guns and howitzers for field service. (Ill.) Eg., July 19, p. 72.

Matériel de campagne de 75 mm., t. r., modèle 1898, système Schneider–Canet, à frein hydraulique et récupérateur à air. Note descriptive. (75-mm rapid-fire field gun, model 1898, Schneider-Canet system, with hydraulic brake and air recuperator. Descriptive notes.) 13 pp., 7 pl. (No place) 1899.

Schneider & Cie. Artillerie Schneider-Canet. Matériel à tir rapide sur roues. Tirs d'ensemble exécutés avec un canon de campagne de 75 mm., un obusier de campagne de 120 mm., un obusier de campagne de 105 mm., et un canon de siège de 120 mm., au champ de tir d'Harfleur le 13 mars 1901. (Schneider & Co. Schneider-Canet ordnance. Rapid-fire guns on wheels. Ranging practice carried out with a 75-mm. field gun, a 120-mm. field howitzer, a 105-mm. field howitzer, and a 120-mm. siege gun, at the Harfleur range on March 13, 1901.) 131 pp.; illustrated. Nevers, 1901.

Germany:

Recent changes in German field artillery matériel. PRAI., Feb., p. 571.

Proposed changes in rapid-fire field artillery matériel. AE, Aug., p. 119.

The new German rapid-fire guns. IR., Sup. 27, p. 786.

New field guns. SMB., Nov., p. 459.

The question of a new rapid-fire field gun. RAG., Feb. p. 262.

Rapid-fire field guns with long recoil. JDAM., Oct., p. 17.

Notes on rapid-fire guns. JDAM., Sept., p. 306.

The employment of field artillery armed with rapid-fire guns. JDAM., June, p. 280.

Ehrhardt rapid-fire artillery matériel. (Ill.) RA.. Jan., p. 340; RMS., p. 250.

Rapid-fire guns, Ehrhardt system, C. 1900. (Description and pls.) MGAGW., No. 3, p. 227.

Battery fire with Ehrhardt guns. (Discussion of a report by the factory.) SMB., Jan., p. 1; Feb., p. 55, 71.

On the Ehrhardt rapid-fire field guns, C. 1900. SMB., Jan., p. 41.

Krupp rapid-fire guns with long recoil. RA., Aug., p. 434.

The Krupp 7.5-cm. rapid-fire field gun with long recoil, model 1901. (Description, data, pls., etc.) RMS., Oct., p. 807.

The latest improvement in Krupp rapid-fire field guns with recoil on carriage. (Ill.) KZ., No. 9, p. 472; USM., Dec., p. 317.

Krupp rapid-fire field guns, models 1899 and 1901. (Ill.) RMS., June, p. 441.

Rapid-fire field guns—Continued.

France—Continued.

Drill for 7.62-cm. (3-in.) quick-firing field gun C. 1901, type Ehrhardt. 7 pp. Düsseldorf, 1901.

Le canon de campagne Fried. Krupp à tir rapide C. 99. (The rapid-fire field gun of Fried. Krupp, construction '99). By Maj. Gen. R. Wille. Translated from the German by Maj. E. Monthaye. 95 pp., 41 figs., 3 pl. Berlin, 1900.

Great Britain:

The English field-gun question. IR., Beih. 19 and 21.

Our new German field artillery guns. E., Mar. 22, p. 288; Eg., Mar. 8, p. 298 (ill.).

The new English rapid-fire field guns. IR., Sup. 30, p. 855.

The new Ehrhardt quick-firing field guns. SA., Apr. 27, p. 261.

Handbook of the 3-pounder Hotchkiss quick-firing gun (land service). 1900. 34 pp., 16 pl. London.

Notes on the use of light quick-firing guns. 7 pp. (No place, no date.)

Italy:

Note on new rapid-fire field gun. MW., Mar. 6, p. 551.

The rapid-fire field gun question. IR., Apr., p. 145.

The rearmament of the artillery. SMB., Feb., p. 97.

New 75-mm. rapid-fire guns. RA., Feb., p. 453.

Netherlands: Experiments with rapid-fire guns. JDAM., Oct., p. 107.

Norway:

Experiments with rapid-fire field guns in 1900. IR., Apr., p. 150.

Report of the experiment commission on the trial battery of Ehrhardt guns. IR., Sup. 31, p. 915.

Order of 21 batteries of Ehrhardt rapid-fire field guns. RA., Sept., p. 518.

New rapid-fire field guns. IR., Oct., p. 430.

Report of the rapid-fire field-gun experiment commission for 1901. IR., Beih. 24.

Norwegian trials with quick-firing guns. Report on the tests made during the winter of 1899–1900 with new field artillery material. 25 pp. (No place, no date.)

Rapport fra kommissionen af 1901 til pröve af hurtigskydende feltskyts. (Report of the committee appointed in 1901 for the test of rapid-fire field guns.) (Supplement to "Norsk Artilleri-Tidsskrift, 3. Hefte 1901.") 39 pp. 2 tab. Kristiania, 1901.

Russia:

Notes on the 3-inch Engelhardt rapid-fire field gun, model 1900. JDAM., Oct., p. 105; IR., Sept., p. 400.

Notes on the new rapid-fire field gun. RAG., Jan., p. 136; Oct., p. 131.

South Africa: Boer field artillery. (Ill.) E., Apr. 26, p. 415.

Spain: Purchase of rapid-fire field guns; account of experiments conducted. RA., Mar., p. 549.

Rapid-fire field guns—Continued.

Sweden:

The rapid-fire gun question; experiments, etc. JDAM., June, p. 314.

Tests of rapid-fire field gun. (Ill.) IR., Sup. 31, p. 911.

Order of Krupp guns. RA., Sept., p. 519.

Finspong (Sweden). VII. Quick-firing 7.5-cm. field gun: Quick-firing 12-cm. gun. 21 pp., 2 pl. Stockholm, 1898.

Switzerland:

Concerning the adoption of a new artillery matériel. NMB., June 1, p. 521.

Message of the federal council on the adoption of the new field gun. (Ill.) SMB., Mar., p. 105.

Rearmament of the field artillery. MGAGW., No. 9, p. 636.

Refusal to adopt the Krupp spring spur gun, model 1900. KZ., No. 8, p. 427.

The rearmament of the field artillery. (Descriptive and numerical data.) MW., May 18, p. 1154.

The new Swiss field artillery matériel, model 1901. (Experiments, description, pls.) RAG., Apr., p. 101.

New field artillery matériel. (Short note on systems tested, etc.) USM., May, p. 222.

The field artillery matériel. (Description with pl.) RCM., Apr. 20, p. 421.

The new field gun, model 1901. (Experiments, description, data, pls.) RMS., Mar., p. 198.

The proposed model 1901 rapid-fire field gun. JDAM., June, p. 309. Model 1901 rapid-fire field gun (numerical data). RA., Apr., p. 87.

The field-gun question. (Account of experiments, etc.) KZ., No. 4, p. 193; IR., Sup. 26, p. 749; JDAM., May, p. 149.

The Swiss field artillery matériel, 1901. (With plates.) KZ., No. 5, p. 245.

Various:

The rapid-fire gun question. SMB., June, p. 240.

Study on rapid-fire field guns with recoil on carriage, especially the Krupp L-30 rapid-fire field gun. IR., Sup. 33, p. 943. (Ill.)

Concerning the new rapid-fire field guns, especially German and French. RAG., July-Aug., p. 99.

The field-gun controversy. (Notes on various systems.) NMB., July 15, p. 63; Sept., p. 239.

Rapid-fire field guns (merits of various brake systems). (Ill.) RA., Feb., p. 433.

Various field-gun systems with recoil on carriage. (Ill.) KZ., No. 5, p. 248; IR., Sup. 27, p. 780.

Study of rapid-fire field guns with recoil on carriage. (Ill.) KZ., No. 8, p. 393.

Field guns with long recoil. (Discussion.) RMS., Apr., p. 281.

Modern artillery. Eg., Mar., p. 297.

Origin of rapid fire in field guns. MA., Aug., p. 132.

The use of artillery in the field. OMWV., Vol. LXII, p. 260.

Rapid-fire field guns—Continued.
  Various—Continued.
    Rapid-fire field matériel of several non-European countries. RAG., May, p. 269.
    Data relative to new rapid-fire field guns adopted by various powers. RAG., Nov., p. 315.
    The type of guns that should be employed with artillery in the field. PRAI., July-Aug., p. 225.
    Rapidity of fire of field artillery. KZ., No. 1, p. 17.
    Firing with rapid-fire guns. MW., Dec. 11, p. 2851.
    Advantages and disadvantages of field guns with recoil on carriage. RMS., June, p. 451.
    Un canon de campagne avec recul de la bouche à feu sur l'affût et frein hydraulique. (A field gun in which the barrel recoils on the carriage, with hydraulic brake.) 18 pp., 1 pl. (Translated from the German, from the Internationale Revue of June, 1900.)
    Où en est la question de l'emploi tactique du canon à tir rapide? (Where does the question of the tactical employment of the rapid-fire gun stand?) 32 pp. Paris, 1901.
    Emploi de l'artillerie de campagne à tir rapide. (The employment of rapid-fire field artillery.) By Gabriel Rouquerol, chef d'escadron. ix, 355 pp. Paris-Nancy, 1901.
    Waffenlehre. (Ordnance and gunnery.) By Wille. Berlin, 1901.
    Der Kampf um die modernen Feldgeschütze. (The contest of the modern field guns.) 28 pp. Berlin, 1901.
Rapid-fire guns (heavy):
  France: The 120-mm. rapid-fire siege and position gun, system Schneider-Canet, followed by some remarks on methods of gun laying. (Ill.) RMS., Aug., p 565.
  Germany: Quick-firing guns, type Ehrhardt, for naval, garrison, and coast-defense artillery. 1899. 8 pp., 5 pl. Düsseldorf.
  Great Britain:
    Speed tests with Vickers and Elswick guns. E., May 31, p. 573.
    The new Vickers-Maxim 7.5-inch rapid-fire gun. (Ill.) SA., Jan. 12, p. 20.
    Les canons à tir rapide de l'artillerie de côte anglaise. (The rapid-fire guns of the English seacoast artillery.) By J. Juge, captain of artillery. 48 pp., 12 figs,, 2 pl. Paris-Nancy, 1900.
Ration bread (*see* Biscuit).
Rations:
  Russia:
    Meat biscuit for soldiers. KZ., No. 4, p. 213.
    A new regulation for packing provision wagons, and composition of iron ration. IR., July, p. 311.
  Various: Canned vegetables and meats used in the principal armies. RSIM., Jan., p. 3.
Ravon improvement on French field gun. MW., Nov. 27, p. 2766; JDAM., Dec., p. 359.

Reconnaissance:

France: Manuel pratique des reconnaissances du terrain. (Practical manual of reconnaissances of the terrain.) By Lieut. Col. Faurie. 51 pp., 10 figs. Paris (no date).

Recruiting:

Argentina: The law of universal service liability. IR., Dec., p. 489.

Austria: Recruit contingents for 1901. IR., May, p. 213.

Belgium:

Distribution of the contingent for 1901. RMAE., Aug., p. 136.

Projet de recrutement de l'armée belge. (Scheme for recruiting the Belgian army.) By Colonel Van Bever. 56 pp. Bruxelles (1900).

Bulgaria: Statistique du recrutement militaire régulier pendant l'année 1898. (Statistics of recruiting for 1898.) 139 pp., 2 pl. Sophia, 1901.

Chile: Principal provisions of the law of Sept. 3, 1900, on military service. RMAE., Mar., p. 275; number of recruits at first levy; IR., Feb., p. 42.

France:

The recruiting of the French army in 1899. JDAM., Feb., p. 210: JUSII., p. 79.

Study on the recruiting of the army. RSIM., May, p. 427.

Distribution of the contingent for 1901. JDAM., Dec., p. 359.

A comparison of the results of recruiting in Germany in 1898 and in France in 1899. IR., Mar., p. 123.

Compte rendu sur le recrutement de l'armée pendant l'année 1900. (Report on the recruiting of the army during the year 1900.) 101 pp. Paris, 1901.

Décrets, circulaires et notes ministérielles relatifs aux engagements volontaires et aux rengagements. (Decrees, circulars, and ministerial notes relative to voluntary enlistments and to reenlistments.) 7th edition, corrected to May, 1901. 113 pp. Paris.

Germany:

Recruiting of the army in 1899. RMAE., Feb., p. 183.

A comparison of the results of recruiting in Germany in 1898 and in France in 1899. IR., Mar., p. 123.

Great Britain:

Recruiting for 1901. JRUSI., May, p. 626.

Annual report of the inspector general of recruiting for the year 1900. 44 pp. London, 1901.

Greece: Number of recruits enlisted in army in 1900. IR., Feb., p. 54.

Italy:

Recruiting statistics of 1899. JRUSI., Jan., p. 99.

Provisional instructions on recruiting service abroad. JRUSI., Aug., p. 1022.

Della leva sui giovani nati nell'anno 1878 e delle vicende del r. esercito dal 1° luglio 1898 al 30 giugno 1899. (The conscription of youths born in 1878, and the changes in the army from July 1, 1898, to June 30, 1899.) Report to the war minister. viii, 144, 7 pp., 8 tables. Roma, 1900.

Recruiting—Continued.
- Netherlands: New recruiting law. JRUSI., July, p. 898.
- Portugal: Obligatory military service. RCM., Mar. 9, p. 274.
- Russia:
  - Results of recruiting in 1900. NMB., Apr. 16, p. 379.
  - Number of recruits to be called out in 1901. JRUSI., Aug., p. 1023.
- Spain:
  - Recruits called up on Mar. 1, 1901. JRUSI., Mar., p. 361; IR., Apr., p. 167.
  - The new recruiting law. RCM., Dec. 14, p. 637.
- Sweden:
  - The new Swedish recruiting system. MW., Sept. 14, p. 2107.
  - Värnpligtslag. (Law on military service liability.) 29 pp. Stockholm, 1901.
- Switzerland:
  - Results of recruiting in 1899. IR., Jan., p. 35; in 1900, IR., May, p. 217.
  - Number of infantry recruits for 1902. RCM., Nov. 30, p. 590.

Recruits, education of:
- Various: The school education of recruits in Russia, France, and Germany. IR., Dec., p. 526.

Recruits, measurement of:
- France: Measurement of recruits according to law of April 12, 1901. NMB., Nov., p. 463.

Red Cross Society:
- Austria: Note on Austrian Red Cross Society. MW., Nov. 20, p. 2739.
- Italy: The Italian Red Cross; personnel, matériel, etc. RMAE., Mar., p. 279.
  - Various: The international Red Cross. (Organization, etc., in various countries.) Die Heere und Flotten der Gegenwart, Germany, 1900, p. 505.

Refugee camps:
- Great Britain: Reports, etc., on the working of the refugee camps in the Transvaal, Orange River Colony, Cape Colony, and Natal. 387 pp. London, 1901.

Relief of widows and orphans:
- Germany: Institutions for the. MW., May 8, p. 1071.
- Great Britain: Report from the joint select committee of the House of Lords and the House of Commons on charitable agencies for relief of widows and orphans of soldiers and sailors. xviii pp. London, 1901.

Remounts (*see also* Horses):
- Belgium: Officers' remounts, according to instructions of April 10, 1901. RMAE., Sept., p. 217.
- France: Creation of a mixed commission of studs and remounts. RCM., Dec. 14, p. 635.
- Italy: New regulation concerning remount service. IR., June, p. 250; Nov., p. 465.
- Japan: Change in remount regulations. IR., Mar., p. 103.

- Remounts—Continued.
  - Spain: Regulations on the establishment of remount and stallion depots. IR., Oct., p. 444.
  - Various: Zucht und Remontirung der Militärpferde aller Staaten. (Breeding and remount service of military horses of all countries.) By Dr. Paul Goldbeck, veterinary surgeon in the 2d Brandenburg uhlan regiment. ix, 415 pp. Berlin, 1901.
- Reorganization (*see* Organization).
- Repairing worn-out guns on service. PRAI., Sept.-Oct., p. 303.
- Repeating pistols (*see* Pistols).
- Repeating rifles (*see* Rifles).
- Requisitions:
  - Various: Requisitions in hostile territory. RMI., June, p. 953.
- Revolvers:
  - Austria: Anleitung für die Instandhaltung und die Behandlung des Revolvers M. 70. (70-74.) (Guide for keeping in repair and handling revolver M. 70.) (70-74.) 52 pp. Wien, 1899.
  - Belgium: Description of several revolvers manufactured in Belgium, viz, Nagant, Pieper, etc. RA., Aug., p. 376 *et seq.*
  - Various: The development of revolvers and pistols. (Description of various models of revolvers and automatic pistols, with plates.) KZ., No. 1, p. 1.
- Rey lance boat. (Ill.) KZ., No. 7, p. 380.
- Riding schools:
  - Germany: Dienstordnung für das Militär-Reit-Institut. (Service regulations for the military riding institute.) 47 pp. Berlin, 1900.
  - Russia: The Russian officers' riding school. (Organization, etc.) IR., Beih. 17, p. 1.
- Rifle clubs (*see* Target practice).
- Rifle ranges (*see* Target ranges).
- Rifles (*see also* Small arms):
  - Austria:
    - Armament of the landsturm troops with Mannlicher rifles. IR., July, p. 305.
    - The 6.5-mm. repeating rifle, model 1900, of the Steyr arms factory, Mannlicher-Schönauer patent. (Description and plates.) MGAGW., No. 10, p. 716.
    - Repetier- und automatische Handfeuerwaffen der Systeme Ferdinand Ritter von Mannlicher. (Mannlicher's repeating and automatic small arms). By Konrad Edler von Kromar, colonel. 16 pp., 37 pl. Wien, 1900.
    - Armes portatives françaises et étrangères. (French and foreign small arms.) By Capt. Bataille. Autriche. Fusil modèle 1895. (Austria. Model 1895 rifle.) 11 pp., 1 pl. Paris, 1898.
  - Belgium: Description of various rifles manufactured in Belgium. RA., Aug., p. 360.
  - France:
    - The new infantry rifle in France and in Germany. RAB., May-June, p. 109.
    - The Daudetau rifle. (Numerical data, etc.) RAG., Mar., p. 382.

Rifles—Continued.

- France—Continued.
    - Note on Lamacchia rifle. RMI., Sept., p. 1680.
    - Armes portatives françaises et étrangères. (French and foreign small arms.) By Capt. Bataille. France. Fusil 1886 M. 1893. (France. 1886 M. 1893 rifle.) 12 pp., 1 pl. Paris, 1898.
- Germany: The new infantry rifle. (Short descriptive note.) NMB., Mar. 15, p. 283.
    - The model '98 rifle. (Complete description with figs.) RI., Apr., p. 327.
    - Note on new rifle, model '98. AE., Feb., p. 18.
    - The new German Mauser rifle, '98. (Ill.) AE., May, p. 70.
    - The new infantry rifle in France and in Germany. RAB., May–June, p. 109.
    - The new infantry rifle. (Short description with figs.) JRUSI., Mar., p. 358.
    - The model '98 German rifle. (Ill.) RMS., Feb., p. 118.
    - Concerning proposed trial of Friberg rifle. IR., Feb., p. 43.
    - Tests with automatic rifles. AE., Sept., p. 136.
    - Leitfaden betreffend das Gewehr und Seitengewehr 98. 1899. (Manual of the model '98 rifle and bayonet.) 1899. Containing all changes made up to November, 1900. 79 pp. Berlin, 1901.
    - Das Gewehr 98. (The model '98 rifle.) Prepared by Captain v. Estorff. 32 pp., 52 figs. Berlin, 1901.
    - Tafel für den Unterricht über das Gewehr 98. (Chart for instruction on the '98 rifle.) Drawn by Schäfer. Berlin, 1901.
- Great Britain:
    - The service rifle on service (defects of). AE., Oct., p. 155.
    - Penetration of the service ammunition. AE., Oct., p. 155.
    - A new magazine rifle mechanism (Hylard). E., Nov. 15, p. 502.
    - The Hylard rifle mechanism. (Ill.) E., Nov. 22, p. 538.
    - A new rifle under consideration. MW., Oct. 2, p. 2281.
    - A new model of the Lee-Metford rifle to be introduced. IR., Mar., p. 97; Aug., p. 342; Dec., p. 498.
    - (India): Armament of Infantry with 7.7-mm. Lee-Enfield rifle. IR., Apr., p. 140; Aug., p. 342.
    - Note on armament of infantry with Lee-Enfield rifle. IR., Oct., p. 419.
- Italy:
    - The Italian service rifle. (Notes on.) AE., Oct., p. 156; USM., Nov., p. 205.
    - Notes on the Freddi rifle. RMS., Feb., p. 162.
- Netherlands: The ballistic data of the new Dutch rifle. JDAM., Jan., p. 93; IR., Sup. 27, p. 785.
- Russia: The Mossine rifle. (Short description.) RA., Aug., p. 375.
- Sweden: New Swedish rifle (Friberg). MA., Jan., p. 75.
- Switzerland:
    - A new Swiss magazine rifle. AE., Aug., p. 119.
    - The short rifle model 1899–1900 prescribed for the armament of special troops. RCM., Mar. 30, p. 362.

Rifles—Continued.
  Various:
    The problem of the rifle of the future. (With pl.) SMB., July, p. 277.
    Comparative study of small arms in service in various countries. RCM., July 27, p. 113.
    The evolution of small arms (rifles) in the 19th century. RAG., July-Aug., p. 175.
    Table showing rifles and powders used in different countries. MW., Mar. 23, p. 675.
    Les armes portatives. (Small arms.) By Major D. 112 pp. Paris, 1901.
Rural guard (*see also* Police):
  Mexico: Colección de decretos, reglamentos y circulares referentes á los cuerpos rurales de la federación desde su fundación hasta la fecha. (Collection of decrees, regulations, and circulars referring to the rural corps of the federation from its foundation to the present.) 353 pp. Mexico, 1900.
Russia:
  Military review of the year 1900. IR., Mar., p. 108.
Russia in China:
  Russia and China in 1900. (With maps.) RA., Mar., p. 486.
  The measures taken by Russia for the suppression of the insurrection in China and the successes achieved by the Russian army in the province of Chili and in Manchuria. JDAM., Mar., p. 301.
  On the mobilization, reenforcement, and present status of the Russian troops in East Asia. MW., Jan. 5, p. 39.
  The military occupation of Manchuria by Russia. RMI., Mar., p. 502.
  The Russian campaign in Manchuria in 1900. (With map.) JUSII., July, p. 213.
  The Russian forces in Manchuria. RCM., Feb. 2, p. 144.
  Russia in China. RCM., Nov. 2, p. 485.
  Russland in Asien. (Russia in Asia.) Vol. IV. Russland in Ost-Asien (mit besonderer Berücksichtigung der Mandschurei). (Russia in Eastern Asia, with special reference to Manchuria.) By Maj. Gen. Krahmer. vi, 221 pp., 1 map. Leipzig, 1899.
Sabers:
  Austria: The new cavalry saber. KZ., No. 8, p. 447.
  Various: Historical sketch on the use of the saber by cavalry. RC., May, p. 161.
Saint-Chamond:
  The St. Chamond artillery exhibit at the Paris Exposition of 1900. (Ill.) RA., June, p. 181.
San Domingo:
  Bill for increasing the armed forces. MW., July 27, p. 1736.
Sanitary service (*see* Medical service).
Sappers:
  France: Règlement du 16 février 1900 sur l'instruction des régiments de sapeurs-mineurs. (Regulations of February 16, 1900, on the instructions of regiments of miners and sappers.) 88 pp. Paris.
Saumur, cavalry school of. (General write-up.) RC., Aug., p. 513.

Schmidt chronograph. (Description and fig.) RAG., Mar., p. 403.

Schneider-Canet:

- Guns constructed by Schneider & Co., Creusot. (With pls.) SMB., June, p. 233.
- Schneider-Canet artillery. MA., Sept., p. 267.
- Schneider-Canet quick-firing guns and howitzers for field service. (Ill.) Eg., July 19, p. 72.
- Schneider-Canet ordnance at the 1900 exposition. RA., Nov., p. 131.
- Graphic comparison of some Krupp and Schneider-Canet guns with reference to their power to pierce armor plates. IR., Sup. 28, p. 811.
- Rapid-fire field matériel, system Schneider-Canet. (Description, data, pls., etc.) RMS., May, p. 337.
- The 120-mm. rapid-fire siege and position gun, system Schneider-Canet, followed by some considerations on methods of laying. (Pls.) RMS., Aug., p. 565.
- Matériel de campagne de 75 mm., t. r., modèle 1898, système Schneider-Canet, à frein hydraulique et récupérateur à air. Note descriptive. (75-mm. rapid-fire field gun, model 1898, Schneider-Canet system, with hydraulic brake and air recuperator. Descriptive notes.) 13 pp., 7 pl. (No place) 1899.
- Établissements de MM. Schneider & Cie. (Messrs. Schneider & Co.'s shops.) 148 pp. Nevers, 1900.
- Exposition Universelle de 1900. Schneider & Cie. Catalogue des objets exposés. (Paris Exposition, 1900. Schneider & Co. Catalogue of exhibits.) 166 pp.; illustrated. Paris, 1900.
- The works of Messrs. Schneider & Co. By James Dredge, C. M. G. Partly reproduced from "Engineering." xviii, 360 pp.; illustrated. London, 1900.
- Schneider & Cie. Artillerie Schneider-Canet. Matériel à tir rapide sur roues. Tirs d'ensemble exécutés avec un canon de campagne de 75 mm., un obusier de campagne de 120 mm., un obusier de campagne de 105 mm., et un canon de siège de 120 mm., au champ de tir d'Harfleur le 13 mars 1901. (Schneider & Co. Schneider-Canet ordnance. Rapid-fire guns on wheels. Ranging practice carried out with a 75-mm. field gun, a 120-mm. field howitzer, a 105-mm. field howitzer, and a 120-mm. siege gun, at the Harfleur range on March 13, 1901.) 131 pp.; illustrated. Nevers, 1901.

Schools (*see also* War colleges):

- France:
  - Programmes des examens imposés aux sous-officiers proposés pour l'admission à l'école d'administration militaire. (Programs of the examinations imposed upon noncommissioned officers proposed for admission to the school of military administration.) 11th edition. 48 pp. Paris (no date).
  - Le Prytanée. (Preparatory military school for officers' sons.) By Gen. Ch. Philebert. 177 pp. Paris (1900).
- Russia: Établissements militaires d'éducation en Russie. (Military educational establishments in Russia.) 137 pp. St. Pétersbourg, 1899.

- Schneider-Canet—Continued.
  - Switzerland: Militärschulen im Jahre 1901. (The military schools in 1901.) 71 pp. Bern, 1901.
- Scouts:
  - Great Britain:
    - Scouting. USM., Oct., p. 60.
    - Scouts in the Indian cavalry. USM., Oct., p. 63.
- Seacoast guns:
  - France: Règlement sur le service des bouches-à-feu de côte. (Regulations on the service of seacoast guns.) Approved July 28, 1894, and modified March 5, 1896, and April 13, 1897. Part I—Titles I, II, III, and IV. Service des bouches-à-feu. (Service of guns.) 2d edition. 175 pp. Paris, 1898.
  - Great Britain: Les canons à tir rapide de l'artillerie de côte anglaise. (The rapid-fire guns of the English seacoast artillery.) By J. Juge, captain of artillery. 48 pp., 12 figs., 2 pl. Paris–Nancy, 1900.
- Servia:
  - Changes in organization of the Servian army. RMAE., Oct., p. 284.
  - Reorganization of the infantry. MW., Apr. 24, p. 980.
  - The new recruiting law. IR., Dec., p. 516.
  - The Servian general staff. IR., Dec., p. 519.
  - The new code of military justice. RCM., July 6, p. 1.
- Sharpshooters:
  - Various: On the training of sharpshooters. (Ill.) KZ., No. 10, p. 543.
- Shields:
  - Great Britain: All rapid-fire guns to be provided with. RAG., July-Aug., p. 152.
  - Italy: Bullet-proof shield invented by Benedetti. RMS., Sept., p. 734.
  - Sweden: Experiments with papier-maché bullet-proof shields for infantry. JRUSI., May, p. 634.
- Shrapnel fire (*see* Fire, shrapnel).
- Siberian railroad (*see* Railroads, Russia).
- Siege artillery:
  - Great Britain: Siege artillery drill. 1900. 135 pp. London.
  - Spain: Reorganization of. RAG., Nov., p. 331.
- Sighting devices:
  - Great Britain:
    - The Clarke automatic sight. (With pls.) MA., Mar., p. 235.
    - Description of the automatic sight of the 12-pdr. rapid-fire gun. MA., Sept., p. 245.
    - Grubb's collimating telescopic gun sight. (Ill.) Eg., May 10, p. 619.
  - Netherlands: The new telescopic sight of the Dutch artillery. (With fig.) KZ., No. 4, p. 211.
  - Various:
    - Automatic sights (use of). (Ill.) PRAI., Mar., p. 613.
    - Armes à feu, viseurs optiques et appareils télescopiques. (Fire arms, optical sighting devices, and telescopic sights.) By Moret de Monjou. 43 pp., 11 figs. Paris (no date).

Signal corps (*see* Telegraphy; Communication troops).

Simpson machine gun:

Note on. RCM., June 29, p. 687.

Sketching, military:

Military landscape drawing in the field and in reconnoissances. (Ill.) JSM., Sept., p. 426.

Skoda:

Spécification du matériel de guerre fabriqué ou en voie de construction dans les ateliers militaires techniques des usines Skoda. (Specifications of the war material manufactured or in the course of construction in the technical military workshops of the Skoda factories.) 11 pp. (No place, no date.)

L'artillerie Skoda à l'exposition universelle de 1900. (The Skoda artillery at the Paris Exposition of 1900.) By M. C. Curey, captain of artillery. (Extract from the Revue d'Artillerie, November, 1900.) 32 pp., 16 figs., 3 pl. Paris–Nancy, 1900.

Développement, installation et production des usines Skoda. (Development, plant, and production of the Skoda shops.) 8 pp. (No place, no date.)

Die Skoda'schen Panzer, Panzerthürme, Panzerlaffeten, gepanzerte Beobachtungs-, Distanzmesser- und elektrische Scheinwerferstände, Panzerschilde und Panzercasematten für Brustwehren und Flankierungs Anlagen, Panzerbatterien. (The Skoda armor: Armor turrets, armored gun-carriages, armored observation, range-finder, and search light stands, armored shields and casemates for breastworks and flanking works, and armored batteries.) iv, 60 pp. Pilsen, 1900.

——— The same. Album of plates. 65 pl. Pilsen, 1900.

Die Skoda'schen Schnellfeuer Feldgeschütze, M. 1900, in drei Systemen: Rohrrücklauf, einfacher Drehsporn, langer Sporn. (The Skoda rapid-fire field guns, M. 1900, in three systems, viz, recoil on carriage, simple rotating spade, and long spade.) 18 pp., 12 pl. Pilsen, 1901.

Small arms (*see also* Rifles, Revolvers, etc.):

Austria: Review of experiments with ordnance and small arms in 1899 and 1900. MGAGW., No. 5, p. 345.

Belgium: Descriptions of various small arms manufactured in Belgium. RA., Aug., p. 360.

Great Britain: Tables of (1) small arms used in the British service; (2) small-arm and machine-gun ammunition in the British service; (3) machine guns in the British service; (4) swords and lances used in the British service (with plates). War office, April, 1900. 4 tables, 8 pl. London.

Russia: Manufactures of small arms. Paris Exposition of 1900. RA., Apr., p. 5.

Various: Waffenlehre. (Ordnance and gunnery.) By Maj. Gen. R. Wille. 2d edition. xii, 968 pp., 359 figs., 8 pl. Berlin, 1901.

Smokeless powder (*see* Powders and explosives).

Smoke-producing shell:

Germany: A new smoke-producing shell. RCM., Nov. 16, p. 537.

Somaliland:

Campaign of the English in, in 1901. NMB., July 1, p. 1.

Correspondence respecting the uprising of the Mullah Mohammed Abdullah in Somaliland, and consequent military operations, 1899-1901. 88 pp. London, 1901.

South African war (*see* Boer war).

Staff college regulations. 17 pp. London, 1901.

Staff service:

France:

Instruction du 20 février 1900 sur le service des états-majors en temps de paix et en campagne. (Instructions of Feb. 20, 1900, on staff service in peace and in the field.) 35 pp. Paris, 1900.

Instruction du 20 février 1900 sur le service des états-majors. (Instructions of Feb. 20, 1900, on staff service.) 36 pp. Paris.

Aide-mémoire de l'officier d'état-major en campagne. (Aide-mémoire of the general staff officer in the field.) 333 pp. Paris, 1901.

Station lists (*see* Organization).

Stenography:

Various: Stenography in modern armies. RCM., Apr. 6, p. 373.

Submarine cables (*see* Cables).

Submarine navigation:

La navigation sous-marine. (Submarine navigation.) By Maurice Gaget. 472 pp. Paris, 1901.

Subsistence trains:

Russia: Reorganization of. RSIM., June, p. 600.

Sudan:

L'État Mahdiste du Soudan. (The Mahdist state of the Sudan.) By Gaston Dujarrac. Preface by Henri Pensa. iv, 312 pp. Paris, 1901.

Sumatra:

Triangulatië van Sumatra. Driehoeksnet van Sumatra's Westkust. De coördinaten der driehoekspunten. (Triangulation of Sumatra. Triangulation of the west coast. Coordinates of triangles.) 145 pp., 1 pl., 1 map. Batavia, 1900.

Supply of ammunition (*see* Ammunition supply).

Surgery:

France: Précis de chirurgie d'armée. (Manual of army surgery.) By J. Toubert, surgeon major. vi, 527 pp., 338 pl. Paris, 1900.

Switzerland:

Rapport du département militaire fédéral sur sa gestion en 1900. (Report of the federal military department for 1900.) 158 pp.

Tactics (*see also* Cavalry; Machine guns; Rapid-fire guns):

France:

Lecture on the history of the French infantry tactics from the Revolution to the present day. USM., Nov., p. 146.

Tactics—Continued.

France—Continued.

Solutions des sujets tactiques donnés depuis 1880 aux examens d'entrée. Par un ancien élève de l'école supérieure de guerre. (Solutions of tactical problems given since 1880 at the entrance examinations of the war school. By a former pupil of the war school.) 5th edition, revised and corrected. 80 pp., 18 sketches. Paris, 1899.

——— The same, since 1894. pp. 81-98, 3 sketches. Paris (no date).

——— The same, given during 1897-1898. pp. 99-111, 2 sketches. Paris (no date).

Germany:

Moltke's tactical problems from 1858 to 1882. Edited by the Prussian grand general staff (department for military history). Authorized translation by Karl von Donat. 173 pp., 27 plans, 9 sketch maps, and 2 sketches in text. London, 1899.

Symptomes d'évolution tactique au début du XXe siècle. Le coup droit allemand. (Symptoms of evolution in tactics at the beginning of the 20th century. The straight stroke of the Germans.) By Captain Chatilleu. 32 pp. Paris, 1900.

Moltkes Militärische Werke. (Moltke's military works.) II. Die Thätigkeit als Chef des Generalstabes der Armee im Frieden. (Acting as chief of the general staff in peace.) Part 2. Moltkes taktisch-strategische Aufsätze aus den Jahren 1857 bis 1871. (Moltke's articles on tactics and strategy from the years 1857-71.) Published by the historical section of the great general staff in honor of the anniversary of Moltke's birthday. xxvi, 376 pp., 5 figs., 24 pl. Berlin, 1900.

Entwickelung des Massengebrauchs der Feldartillerie und des Schiessens in grösseren Artillerieverbänden in Preussen. Für Offiziere aller Waffen. (Evolution of the employment of masses of field artillery and of firing in large artillery units in Prussia. For officers of all arms.) By E. v. Hofbauer, general of artillery. vii, 301 pp. Berlin, 1900.

Lösungen taktischer Aufgaben aus den Aufnahmeprüfungen zur Kriegsakademie 1886 bis 1900, mit Berücksichtigung der Feld-dienst-Ordnung vom 1. Januar 1900. (Solutions of tactical problems, taken from the entrance examinations to the war academy from 1886 to 1900, with reference to the field service regulations of January 1, 1900.) By L. Hauschild, first lieutenant in the Turkish general staff and instructor in the Turkish general staff school. 83 pp. Berlin, 1900.

Taktische und strategische Grundsätze der Gegenwart. (Tactical and strategical principles of the present.) By von Schlichting, general of infantry.

Part I. Die Taktik der Waffen im Lichte der Heeresvorschriften. (Tactics of the various arms in the light of the army regulations.) 3d edition. xiv, 194 pp. Berlin, 1898.

Tactics—Continued.
  Germany—Continued.
    Taktische und strategische Grundsätze der Gegenwart—Cont'd.
      Part II. Truppenführung. Erstes Buch: Die Operationen. (Troop leading. First book: The operations.) 3d edition. viii, 272 pp. Berlin, 1898.
      Part III. The same. Zweites Buch: Die Taktik im Dienste der Operationen. (Second book: Tactics in the service of operations.) vi, 282 pp., 4 maps. Berlin, 1899.
    Taktik. (Tactics.) By Captain Balck. First part.
      First half. Einleitung und formale Taktik der Infanterie. (Introduction and formal tactics of infantry.) 2d enlarged and improved edition. x, 334 pp., maps. Berlin, 1899.
      Second half. Formale Taktik der Kavallerie und Artillerie. (Formal tactics of cavalry and artillery.) vii, 250 pp. Berlin, 1897.
    Modern European tactics. By Captain Balck of the German army. Translated, with numerous explanatory notes, by Louis R. M. Maxwell. Vol. I. Introduction and principles of employment of infantry. xiv, 386 pp. London, 1899.
  Great Britain: The present status of tactics according to English views. MW., July 6, p. 1559.
  Various:
    Principles of instruction in tactics. USM., Dec., p. 313.
    Formation by the flank on the battlefield. RMS., Feb., p. 105.
    Cavalry tactics. (Lecture.) RC., June, p. 257.
    Notes on the evolution of infantry tactics. USM., Aug., p. 457.
Taku forts, armament of. IR., Apr., p. 173.
Target practice (*see also* Firing instruction; Firing schools, etc.):
  Austria: Offensive maneuvers with real fire. (Account.) RCM., Oct. 19, p. 416.
  France:
    Program of the Paris ordnance firing club. RCM., Oct. 12, p. 399.
    Practical artillery experiment boards and practical artillery firing courses. MGAGW., No. 4, p. 328.
    Notes on practice at an invisible target. RA., May, p. 112.
  Germany: Combat firing—the main object of our infantry training. KZ., No. 7, p. 345.
  Great Britain:
    Combat firing by battalion. MW., Oct. 30, p. 2526.
    Report on the musketry training of the regular forces serving at home, etc., during the year 1899–1900. 110 pp. London, 1901.
  Italy:
    Target practice and the nation in arms. RMI., Mar., p. 369.
    Regulations for target practice of officers with revolvers. IR., Sept., p. 388.
    Target practice in 1901. RMAE., May, p. 437.
    National target-practice commission. MW., Sept. 14, p. 2112.
  Japan: Note on military rifle club. IR., June, p. 253.

Target practice—Continued.

Mexico: Reglamento para el ejercicio de tiro al blanco de la infantería y caballería. (Regulations for target practice of infantry and cavalry.) 18 pp., 2 pl. Decree of June 25, 1897. Mexico, 1899.

Russia:

Practice of fortress artillery at movable target. IR., Dec., p. 507.

Artillery marching and firing exercises in winter. IR., July, p. 308.

Artillery target practice at night. RCM., Aug. 31, p. 253.

Firing contest between a company and a battery of artillery. RCM., Nov. 30, p. 590.

Competitive firing at the Russian artillery officers' firing school. MW., Oct. 26, p. 2493.

Combat firing of fortress artillery. RAG., Oct., p. 146.

Target practice of infantry at targets floating at sea. SMB., Nov., p. 457; IR., Dec., p. 504; RCM., Nov. 9, p. 512.

Spain: Appropriation for artillery target practice. IR., Oct., p. 444.

Switzerland:

Firing programs for infantry schools and courses. SMB., Mar., p. 131.

Schiessprogram für die freiwilligen Schiessübungen pro 1901. (Program for the volunteer target practice for 1901.) 7 pp., 1 pl. Bern, 1901.

XXXVIIme tir fédéral du 30 juin au 11 juillet 1901 à Lucerne. Plan et règlement du tir. (Thirty-seventh federal firing contest, June 30 to July 11, 1901. Plan and regulations of the firing.) 66 pp. Lucerne, 1901.

Various:

Rules for seacoast fire. MA., Apr., p. 334; Aug., p. 113.

Perfecting of warlike firing by the use of disappearing targets. RAG., Nov., p. 293.

Firing schools and similar institutions in all countries. NMB., Jan. 1, p. 34.

Training of sharpshooters. (Ill.) KZ., No. 10, p. 543.

Firing of infantry with auxiliary targets (indirect fire). MW., June 12, p. 1365.

On the necessity of getting the range with volleys and by the aid of auxiliary targets. MW., July 20, p. 1651.

The recognition of targets and improvisation of auxiliary means for firing with fortress artillery. RAG., Nov., p. 275.

Suggestions for rules of ranging for infantry. USM., June, p. 317.

Musketry and discipline. USM., July, p. 365; Nov., p. 186.

Musketry practice. By an artillery officer. USM., July, p. 372.

Target ranges:

Switzerland: Report by Major the Honble. T. F. Fremantle, 1st Bucks volunteer rifle corps, and Capt. E. C. H. Grant, Argyll and Sutherland highlanders, on Swiss rifle ranges. 9 pp. London, 1901.

Various: Choice and establishment of target ranges for small-arm practice. JSM., Sept., p. 373.

Targets:
  Austria: Automatic targets. MW., Sept. 21, p. 2212.
  Germany: The perfection of combat firing by the use of disappearing targets. (Figs.) MW., July 10, p. 1594.
  Great Britain:
    A moving target for miniature ranges. (With pl.) PRAI., Jan., p. 505.
    A collapsible "head target." USM., July, p. 481.
    Electric targets at Aldershot. RCM., Nov. 2, p. 489.
    Instructions for moving and vanishing targets on ranges. 10 pl. London, 1901.
  Netherlands: New targets adopted. (Ill.) IMT., June, p. 425.
  Russia: A revolving target. (Fig.) KZ., No. 9, p. 508; RCM., July 6, p. 18.
Telegraphy:
  Belgium: Military field telegraphic apparatus in use in Belgium. (Description and plates.) RAG., Jan., p. 111.
  France:
    Changes in military telegraph service in 1900. KZ., No. 8, p. 449.
    Training of fortress telegraphists in France. KZ., No. 10, p. 563.
    Instruction of cavalry in telegraphy. IR., Mar., p. 88.
    Colonial telegraphists. RCM., July 27, p. 126.
  Germany: School of telegraphy for cavalry. (Organization, etc.) RMAE., Sept., p. 219; USM., Dec., p. 316.
    Mexico: Reglamento de la compañía de telegrafistas militares. (Regulations for the company of field telegraphers.) By Pedro L. de la Cerda, captain of engineers. 22 pp., 3 pl. Mexico, 1901.
Telemeters (*see* Range finders).
Telescopic sights:
  Netherlands: The new telescopic sight of the Dutch artillery. (With fig.) KZ., No. 4, p. 211.
Tents:
  Italy: Adoption of a conical tent. RMAE., Feb., p. 189.
  Switzerland:
    The Swiss shelter tent. RSIM., Sept., p. 949.
    The new portable tents of the Swiss army. SMB., Mar., p. 145.
    Instructions for the use of the portable tent. (Ill.) SMB., Aug., p. 395.
    The portable tent. (Ill.) RMS., Aug., p. 597.
Thornycroft motor wagons. (Ill.) E., May 31, p. 575; June 7, p. 594; Dec. 13, p. 604.
Tires, proposed method of increasing breadth of, of a 6-inch howitzer carriage for a 4.7-inch gun. (Ill.) PRAI., July–Aug., p. 201.
Torpedoes:
  Russia: Tests with torpedoes. IR., Apr., p. 161.
  Sweden: Note on Unge's new aërial torpedo. RAG., Feb., p. 270; Oct., p. 148; Eg., Feb. 8, p. 184.
Traction engines (*see* Automobiles).

Train:

- Austria: Reorganization of the train. IR., Feb., p. 66.
- Germany: Exerzir-Reglement für den Train. (Drill regulations for the train.) New edition, with the addition of the music for signals of June, 1897. ix, 103 pp. Berlin, 1894.
- Switzerland: The service of the train. RMS., Nov., p. 922.

Training:

- Great Britain (India): The practical training of British and native troops in India with reference to the lessons of the war in South Africa. JUSII., July, pp. 153, 186; Oct., p. 261.
- Italy: The new method of training the Italian infantry. IR., June, p. 248.
- Various:
  - Military training in secondary schools. (Lecture.) JRUSI., Feb., p. 115.
  - Modern military training. USM., July, p. 404.
  - The training of an army. USM., May, p. 179.

Transportation:

- France:
  - Instruction du 30 juin 1900 sur les commissions de gare. (Instructions of June 30, 1900, concerning the transportation committees at railroad stations.) 28 pp. Paris.
  - Instruction spéciale pour le transport des troupes de cavalerie par les voies ferrées. (Special instructions for the transportation of cavalry troops by rail.) (Decrees of November 18 and 19, 1889; September 4, 1894, and October 20, 1894, and ministerial note of January 16, 1895.) 146 pp., 35 pl. Paris (no date).
  - Instruction spéciale pour le transport des troupes d'infanterie et du génie par les voies ferrées, suivie d'une annexe spéciale relative au transport de ces troupes par voies maritimes. (Special instructions for the transportation by rail of infantry and engineer troops, followed by an appendix on the transportation of these troops by sea.) 7th edition, annotated and brought up to date. xi, 353 pp., 36 pl. Paris, 1899.
  - Transports militaires par chemins de fer. (Guerre et marine.) (Military transportation by rail. Army and navy.) (Bulletin officiel du ministère de la guerre.) Brought down to May 1, 1899. 789 pp. Paris.
  - Instruction spéciale pour le transport des troupes d'artillerie de campagne et de montagne et du train des équipages par chemins de fer. (Special instructions for the transportation by rail of field and mountain artillery and train troops.) 165 pp. Paris, 1900.
- Germany: Decision concerning conveyance of troops by rail in case of mobilization. USM., Sept., p. 651.
- Great Britain (India): Experiences of a horse transport from India to China. PRAI., Jan., p. 553.

Transportation—Continued.

Russia:

Transportation of troops and war stores by the Trans-Siberian railroad in 1900 on the occasion of the events in Manchuria. JSM., Nov., p. 249.

Transportation by sea of the Russian troops to China in 1900. RCM., July 18, p. 34.

Trenches:

France: Note on a trench for marksman seated. RGM., June, p. 482.

Turkish army:

Handbook of the Turkish army. Prepared in the intelligence division of the war office, by Capt. M. C. P. Ward, R. A., staff captain. 1900. 48 pp., 1 map. London.

Unge aërial torpedo. Note on. RAG., Feb., p. 270; Eg., Feb. 8, p. 184.

Uniforms.

Austria: Adjustierungsblätter des k. u. k. österr.-ungar. Heeres, der Kriegsmarine und der beiden Landwehren. (Uniforms of the Austro-Hungarian army, navy, and both landwehrs.) Drawn from nature by First Lieut. Camillo Righetti. 29 pl. Leipzig (no date).

Denmark: Den danske Haer og Flaade. (The Danish army and navy.) 9 colored charts of uniforms. (No place, no date.)

France:

Adoption of khaki for colonial uniforms. RCM., July 6, p. 16.

Description du 15 janvier 1899 des uniformes de la cavalerie. (Description of January 15, 1899, of the uniforms of the cavalry.) Corrected up to July 1, 1900. 245 pp. Paris.

Description de l'uniforme de l'école militaire de l'artillerie et du génie. (Description of the uniform of the artillery and engineer school.) (Bulletin officiel du ministère de la guerre.) Corrected to January 1, 1900. 20 pp. Paris.

Description de l'uniforme de l'école spéciale militaire. (Description of the uniform of the special military school.) (Bulletin officiel du ministère de la guerre.) Corrected to January 1, 1900. 99 pp. Paris.

Description de l'uniforme de l'école d'administration militaire. (Description of the uniform of the school of military administration.) (Bulletin officiel du ministère de la guerre.) Corrected to May 1, 1900. 12 pp. Paris.

Description de l'uniforme de l'école militaire d'infanterie. (Description of the uniform of the infantry school.) (Bulletin officiel du ministère de la guerre.) Corrected up to January 1, 1900. 19 pp. Paris.

Description de l'uniforme du Prytanée militaire. (Description of the uniform of the *Prytanée militaire*.) (Bulletin officiel du ministère de la guerre.) Corrected up to January 1, 1900. 46 pp. Paris.

Tenue des troupes en campagne et en Afrique. (The dress of troops in the field and in Africa.) Corrected to July 1, 1900. 62 pp. Paris.

Uniforms—Continued.

Germany:

Trial of new uniforms for home and expeditionary troops. RMAE., Feb., p. 186.

On the question of changing the uniforms. MW., Apr. 3, p. 787; RCM., July, p. 122.

Die deutsche Armee. (The German army.) 6 charts of uniforms in colors. Leipzig (1901?).

Militär-Informations-Tafeln, No. 24. Deutsches Reich. (Military information charts, No. 24, German Empire.) Colored plates of uniforms. By Carl Henckel. Dresden, 1900.

Great Britain:

The soldier's clothing. USM., Oct., p. 87.

Khaki, or what? USM., Oct., p. 91.

The dress of the army. USM., Oct., p. 95.

Uniform and equipment. (Discussion.) JUSII, Jan., p. 68.

Dress regulations for the officers of the army. (Including the militia.) War office, 1900. vi, 118 pp., 79 pl. London.

Netherlands: Beschrijving van de uniformen van de landmacht. (Description of the uniforms of the land forces.) According to decree of Oct. 2, 1900. xi, 235 pp. 's-Gravenhage, 1900.

Russia: Die russische Armee in ihrer gegenwärtigen Uniformirung. (The Russian army. Illustrations of its present uniforms.) 48 pp., 20 colored pls. 3d edition. Leipzig (1901?).

Sweden: Proposed change in the uniforms of troops. IR., Dec., p. 514.

Various:

The visibility of uniforms in the field. RCM., Mar. 16, p. 285.

Experiments to determine the visibility of different colored uniforms. NMB., Apr. 1, p. 329.

Uruguay:

Mensaje del Presidente de la República ciudadano Don Juan L. Cuestas á la H. asemblea general al inaugurar el tercer período de la XX. legislatura. (Message of the President of the Republic (of Uruguay), Juan L. Cuestas, to the general assembly at the beginning of the third period of the 20th legislature.) February 15, 1901. 87 pp. Montevideo, 1901.

Venezuela:

The army system of Venezuela. JDAM., May, p. 208.

Colombia and Venezuela. (Army system, etc.) MW., Sept. 18, p. 2129; RCM., Oct. 5, p. 364.

Veterinary service:

Great Britain: Regulations for army veterinary services. 1900. 78 pp. London.

Vickers:

Great Britain: Vickers' gun-mounting works at Barrow-in-Furness. (Ill.) Eg., July 26, p. 110.

Vickers-Maxim:

The Vickers-Maxim ordnance at the Paris Exposition of 1900. (Ill.) RA., Feb., p. 365.

The new Vickers-Maxim 7.5-inch rapid-fire gun. (Ill.) SA., Jan. 12, p. 20.

Vickers-Maxim—Continued.
  Paris Exposition, 1900. Vickers' Sons & Maxim, Ltd. 89 pp.; illustrated. (No place, no date.)
Volunteers:
  Great Britain:
    Regulations for the volunteer force, 1901. vi, 357 pp. London.
    The annual return of the volunteer corps of Great Britain for the year 1900. 61 pp. London, 1901.
    Proposed amendment of the scheme relative to the efficiency of volunteers under order in council, dated July 31, 1880, as amended by subsequent orders. 9 pp. London, 1901.
    Volunteer regulations respecting the conditions of efficiency for officers and volunteers. 19 pp. London, 1901.
Von Löbell's annual reports on the changes and progress in military matters in 1900. (Précis.) JRUSI., Oct., p. 1183.
Wagon, infantry (*see* Infantry wagon).
War colleges:
  Argentina: The Argentine war academy. MW., July 17, p. 1642.
  Austria: Organisation der Kriegsschule vom Jahr 1900. (Organization of the war school, 1900.) (Taschen-Ausgabe der Militär-Vorschriften, zusammengestellt für den Feldgebrauch.) 21 pp. Wien, 1900.
  Russia:
    The Russian general staff academy at the beginning of the 20th century. MW., May 11, p. 1101.
    Results attained at, in 1900. IR., Apr., p. 158.
War dogs (*see* Dogs, war).
War game:
  France: Exercises on the map. RCM., Nov. 16, p. 525.
  Germany: Lehnert's Handbuch für den Truppenführer. (Handbook of the troop leader.) Berlin, 1901.
  Various:
    The naval war game. (Ill.) E., Jan. 4, p. 10.
    The naval war game under coast warfare rules. (Ill.) E., May 31, p. 563.
    The naval war game. E., Aug. 23, p. 197.
    The naval maneuvers and the naval war game. (Ill.) E., Oct. 4, p. 352.
    Le jeu de guerre dans les corps de troupe. (The war game in the regiment.) By Major M. 28 pp. Paris-Nancy, 1901.
War ministry:
  Argentina: Reorganization of war department. MW., July 27, p. 1733.
  Great Britain:
    Summary of proposed war office reorganization. RCM., June 22, p. 664.
    Report of the committee appointed to inquire into war office reorganization. 25 pp. London, 1901.
    Order in council defining the duties of the principal officers of the war department. 4 pp. London, 1901.
  Russia: Change in organization of. RMAE., May, p. 439.

War office (*see* War ministry).
Weldless tubes:
  Manufacture of weldless tubes. (Ill.) RA., Jan., 1901, p. 328.
Wireless telegraphy:
  Marconi's wireless telegraphy automobile for military purposes. (Ill.) SA., July 20, p. 40.
Wounds:
  Notes on the wounding effects of modern firearms (rifles and revolvers). (Ill.) RA., Aug., p. 399.
  On the effects of small-caliber rifle bullets. RAG., Jan., p. 124.
  Traitement des blessures de guerre. (Treatment of wounds in war.) By H. Nimier and Ed. Laval, surgeons. 522 pp. Paris, 1901.
Yeomanry:
  Great Britain:
    Reorganization of the yeomanry. RMAE., Aug., p. 133.
    Formation of new companies of yeomanry. RMAE., Nov., p. 358.
    The yeomanry. USM., Oct., p. 48.
    Committee on the organization, arms, and equipment of the yeomanry force. 16 pp. London, 1901.
Zeiss binocular field glass, hints on use of. KZ., No. 9, p. 477.

INDEX.

Page.

- Academy of the general staff. (*See* War school.)
- Accelerated-fire guns 81
- Accounts. (*See* Administrative troops.)
- Action, supply of ammunition in. (*See* Ammunition supply in action.)
- Adjutant general's department, Great Britain 266, 267
- Administrative troops (intendants, commissariat, subsistence companies, etc.), Sweden 80
- Administrative troops (intendants, commissariat, subsistence companies, etc.), appropriations:
  - Algeria 10
  - Austria-Hungary 5
  - France 10
  - Great Britain 31
  - Italy 33
  - Mexico (department of rolls and accounts) 36
  - Netherlands 37
  - Norway 38
  - Portugal 39
  - Switzerland 48
  - Tunis 10
- Administrative troops (intendants, commissariat, subsistence companies, etc.), strength and composition. (*See* Strength and composition of administrative troops.)
- Admission to general staff. (*See* Appointment to general staff.)
- Adrianople fortifications, Turkey 297
- Ægean Sea fortifications, Turkey 296
- Age limits of military service liability:
  - Brazil 57
  - Chile 59
  - Netherlands 60
  - Peru 64, 65
  - Servia 71, 72
  - Switzerland 48
- Age of carrier pigeons. (*See* Carrier pigeons, age.)
- Ages of recruits. (*See* Age limits of military service liability.)
- Ages of reserve men. (*See* Age limits of military service liability.)
- Ages of volunteers, Peru 64
- Aids-de-camp, Servia 70
- Aids-de-camp, appropriations, Germany 15

Page.

- Ak-Tabia. (*See* Dardanelles fortifications.)
- Aldershot exercises of the cyclist infantry, Great Britain 262, 265
- Alexander cadet corps, Russia 280
- Alexander II preparatory school, Russia 281
- Alexandropol headquarters, Russia 43
- Algiers engineer school 249
- Allowances of officers:
  - Great Britain 28, 29, 30
  - Italy 33
- Allowances of troops, appropriations:
  - Algeria 10
  - Austria-Hungary 5
  - Belgium 7
  - France 10
  - Germany 15
  - Great Britain 22, 28, 29, 30, 31
  - Italy 33
  - Japan 34
  - Netherlands 37
  - Norway 38
  - Portugal 39
  - Sweden 47
  - Switzerland 48
  - Tunis 10
- Alpine troops, winter exercises, Italy 274
- Alum for South Africa, Great Britain 270
- Aluminum in explosives 195
- American horses and mules for South Africa, Great Britain 270
- Ammunition, appropriation. (*See* Arms and ammunition, appropriation.)
- Ammunition, artillery:
  - Argentina 96
  - Austria-Hungary 92
  - Boer 109
  - Darmancier and Dalzon 111, 113, 118
  - Ehrhardt 118
  - France 92, 93
  - Germany 93
  - Great Britain 94
  - Italy 89, 90, 94
  - Japan 97, 371
  - Krupp 118
  - Mexico 98, 101
  - Norway 379
  - Russia 94, 95
  - Spain 102
  - Sweden 103
  - Switzerland 107, 118

Page.

- Ammunition, artillery, how replenished:
  - Austria-Hungary, 199
  - France, 202, 204
  - Germany, 207, 208
  - Great Britain, 211, 212
  - Italy, 213
  - Russia, 217
- Ammunition, artillery, number of rounds per gun:
  - Austria-Hungary, 92, 198
  - France, 92, 93, 202
  - Germany, 93, 205
  - Great Britain, 94, 209
  - Italy, 94, 213
  - Russia, 94, 95, 216
- Ammunition carts. (*See* Ammunition wagons and carts.)
- Ammunition, cavalry:
  - Austria-Hungary, 197, 199, 200
  - France, 201
  - Germany, 204, 205, 206, 208
  - Great Britain, 208, 209
  - Italy, 212
  - Japan, 371
  - Norway, 379
  - Russia, 214
- Ammunition columns:
  - Austria-Hungary, 199
  - France, 203, 204
  - Germany, 204, 205, 207, 208
  - Great Britain, 209, 210, 211, 212
  - Italy, 212, 213
  - Russia, 217
- Ammunition, engineers, Norway, 379
- Ammunition, infantry:
  - Austria-Hungary, 197, 198, 200
  - Belgium, 217
  - Denmark, 217
  - France, 200, 202, 203
  - Germany, 204, 205, 206, 208
  - Greece, 217
  - Great Britain, 208, 209, 210
  - Italy, 212
  - Japan, 370
  - Netherlands, 217
  - Norway, 217, 378, 379
  - Roumania, 217
  - Russia, 214, 215, 216
  - Servia, 217
  - Spain, 217
  - Sweden, 217
  - Turkey, 217
- Ammunition, machine guns, number of rounds, Great Britain, 208
- Ammunition, maneuvers:
  - Norway, 378, 379
  - Switzerland, 411, 437
- Ammunition, manufacture. (*See* Arms and ammunition, manufacture.)
- Ammunition parks:
  - Austria-Hungary, 197, 199, 200
  - France, 204

Page.

- Ammunition parks—Continued.
  - Germany, 204, 208
  - Great Britain, 212
  - Italy, 213
  - Russia, 214, 217
- Ammunition per gun. (*See* Ammunition, artillery, number of rounds per gun.)
- Ammunition, revolver and pistol:
  - Austria-Hungary, 197
  - France, 200, 201
  - Germany, 204, 205
  - Great Britain, 208
- Ammunition, supply in action:
  - Austria-Hungary—
    - Artillery, 199
    - Cavalry, 199
    - Infantry, 198, 199
  - France—
    - Artillery, 203, 204
    - Infantry, 202, 203
  - Germany—
    - Artillery, 206, 207, 208
    - Cavalry, 206
    - Infantry, 205, 206, 208
    - Pioneers, 206
    - Telegraph troops, 206
  - Great Britain—
    - Artillery, 211, 212
    - Infantry, 209–211
  - Italy—
    - Artillery, 213
    - Infantry, 213
  - Russia—
    - Artillery, 216, 217
    - Infantry, 215, 216
- Ammunition supply in the field:
  - Austria-Hungary—
    - Artillery, 198, 199, 200
    - Cavalry, 197, 199, 200
    - Infantry, 197, 198, 200
    - Pioneers, 200
  - Belgium, small arms, 217
  - Denmark, small arms, 217
  - France—
    - Artillery, 201, 203, 204
    - Cavalry, 201
    - Infantry, 200, 202, 203
  - Germany—
    - Artillery, 205, 207, 208
    - Cavalry, 204, 205, 206, 208
    - Infantry, 204, 205, 206, 208
  - Greece, small arms, 217
  - Great Britain—
    - Artillery, 208, 209, 211
    - Cavalry, 208, 209
    - Engineer troops, 208
    - Infantry, 208, 209, 210
    - Machine guns, 208
    - Mounted infantry, 208
  - Italy—
    - Alpine regiments, 212
    - Artillery, 213

Page.
Ammunition supply in the field—Continued.
  Italy—Continued.
    Cavalry 212
    Infantry 212
  Netherlands, small arms 217
  Norway, small arms 217
  Roumania, small arms 217
  Russia—
    Artillery 216, 217
    Cavalry 214
    Infantry 214, 215, 216
  Servia, small arms 217
  Spain, small arms 217
  Sweden, small arms 217
  Turkey, small arms 217
Ammunition train, Norway 379
Ammunition wagons and carts:
  Austria-Hungary, infantry 197
  France—
    Artillery 201, 202, 203, 204
    Small-arm ammunition 200, 203
  Germany—
    Artillery 208
    Small-arm ammunition 205, 206, 208
  Great Britain—
    Artillery 211
    Small-arm ammunition 208, 209, 210
  Italy—
    Artillery 213
    Small-arm ammunition 212
  Norway 378
  Russia—
    Artillery 217
    Small-arm ammunition 214, 215, 216
Ammunition wagons, company. (*See* Company ammunition wagons.)
Amur cossacks 43
Amur military district, Russia 43
Amur military district, cadet corps, Russia 281
Anadoli-Kavak. (*See* Bosphorus fortifications.)
Apirite:
  Italy 191
  Sweden 191
Apparatus for crossing streams, France 250, 251
Apparatus for soda water manufacture in South Africa, Great Britain 269
Appointment of noncommissioned officers, Switzerland 51
Appointment of officers, Switzerland 51, 52, 53
Appointment to general staff:
  Servia 70, 71, 294, 295
  Turkey 295
Arakcheyev cadet corps, Russia 280
Archives, great general staff, Servia 69
Archivists, number of, France 11
Argentina:
  Carrier pigeons 237
  Changes in the army 55, 56
  Field guns 96
  Great general staff 56
  Rifle Table C
  War department 55

Page.
Argentine horses for South Africa, Great Britain 270
Arisaka field guns in Japan 97
Armament of cavalry, new, Italy 275
Armored train used in Boer war, Great Britain 272–274
Arms and ammunition, appropriation:
  France 11
  Japan 34
  Switzerland 48
Arms and ammunition, manufacture, Switzerland 48
Army. (*See* Strength and composition of army.)
Army corps, distribution of. (*See* Distribution of the army.)
Army corps, machine guns. (*See* Machine guns with army corps.)
Army-corps maneuvers, duration of marches, Russia 287
Army expenditures:
  Algeria 10
  Austria-Hungary 5, 6
  Bavaria 15
  Belgium 7
  British colonies 19, 20, 22, 25
  Denmark 8
  France 9, 10, 11
  German colonies 15
  Germany 15
  Great Britain 18–22, 28, 29, 30, 31
  Italy 33
  Japan 34, 35
  Mexico 36
  Netherlands 37
  Norway 38
  Portugal 39
  Russia 40
  Spain 44
  Sweden 47
  Switzerland 48
  Tunis 10
Army officers abroad. (*See* Officers abroad.)
Army reorganization. (*See* Reorganization of the army.)
Army service corps, strength and composition. (*See* Strength and composition of army service corps.)
Artillery:
  Sweden 77, 78, 79
  Switzerland 105–108
Artillery and ammunition. (*See* Ammunition, artillery.)
Artillery, appropriations:
  Algeria 10
  Austria-Hungary 5
  Belgium (ordnance department) 7
  France 10, 11
  Germany 15
  Great Britain (pay of officers and enlisted men) 28, 29, 31
  Italy 33
  Mexico 36

Page.

Artillery, appropriations—Continued.
- Netherlands (ordnance department) 37
- Norway 38
- Russia 40
- Spain 44
- Sweden 47
- Switzerland (material) 48
- Tunis 10

Artillery, coast. (*See* Coast artillery.)
Artillery, field (*See* Field artillery.)
Artillery, fortress. (*See* Fortress artillery.)
Artillery, in maneuvers:
- France 326
- Germany 328, 352
- Japan 370, 371
- Norway 377, 378, 398, 400, 401
- Switzerland 412, 436

Artillery machine guns. (*See* Machine guns with horse artillery.)
Artillery material (*See* Guns, number of.)
Artillery material, appropriation, France 10
Artillery, position. (*See* Position, artillery.)
Artillery schools. (*See* Schools and military education, artillery.)
Artillery, strength and composition. (*See* Strength and composition of artillery.)
Askabad headquarters, Russia 43
Aspirant reserve officers, education of, Chile 59
Astrakhan headquarters, Russia 42
Attachés:
- Argentina 56
- Austria-Hungary 6
- Japan 34, 275, 276

Attachés, appropriations, Japan 34
Attachés, number of, Austria-Hungary 6
Attack formation, infantry:
- France 324, 325
- Switzerland 437

Auditing department, appropriation, Austria-Hungary 5
Australian horses for South Africa, Great Britain 270
Austria-Hungary:
- Ammunition, artillery, how replenished 199
- Ammunition columns 199
- Ammunition parks 197, 199, 200
- Ammunition supply in action 198, 199
- Ammunition supply in the field 197, 198, 199, 200
- Ammunition wagon 197
- Army strength and composition 6
- Automatic pistols 171
- Bronze used for field guns 82
- Budget 5, 6
- Carbine 197
- Carrier pigeons 237
- Cartridges, number carried by soldier 197
- Cartridges, number in company ammunition wagon 197
- Columns, ammunition 199

Page.

Austria-Hungary—Continued.
- Field guns 82, 83, 92
- Field howitzers 82, 83
- Firing line, how supplied 198, 199
- General staff corps 6
- Howitzers 82, 83
- Machine guns 122, 126–130
- Mannlicher rifle Table C, 197
- Pistols, automatic 171
- Powders and explosives Table C, 92, 186, 189, 190, 191, 194
- Revolver ammunition 197
- Rifles Table C, 155, 197
- Strength and composition of the army 6
- Supply of ammunition in action 198, 199
- Supply of ammunition in the field 197, 198, 199, 200

Automatic machine guns. (*See* Machine guns.)
Automatic pistols. (*See* Pistols, automatic.)
Automobiles:
- France 219
- Germany 219
- Switzerland 219

Automobiles, Daimler, in Swiss maneuvers 219
Automobiles in maneuvers:
- France 219, 327
- Germany 219, 356, 357
- Switzerland 219, 435

Automobiles, Panhard & Levassor, Switzerland 219
Automobiles, Peugeot, Switzerland 219
B. powder, France 192
B. E. C. powder, Great Britain 191
B. F. powder, France Table C
B. N. powder, France 190, 191, 192
Bakhtina cadet corps, Russia 280
Ballistic data, automatic pistols:
- Browning 170
- Borchardt 170
- Colt 170
- Mannlicher 170
- Mauser 170
- Parabellum 170

Ballistic data, field guns, etc.:
- Argentina 96
- Austria-Hungary 92
- Darmancier and Dalzon 113, 118
- Ehrhardt 118
- France 92, 93
- Great Britain 94
- Italy 94
- Krupp 118
- Russia 94, 95
- Spain 102
- Sweden 103
- Switzerland 118

Ballistite:
- Italy 186, 189, 191, 192
- Norway Table C, 189, 192
- Sweden 187, 192

Balloon battalion, changes in, Germany 16

Page.

- Balloon, firing at, Germany 252
- Balloon troops, strength and composition. (*See* Strength and composition of balloon troops.)
- Balloons and ballooning:
  - France 327
  - Germany 358
  - Russia 278
  - Switzerland 435, 436
- Balloons and ballooning, appropriations, France 11
- Balloons and ballooning, course of instruction for officers, Russia 278
- Balloons and ballooning in maneuvers:
  - France 327
  - Germany 358
  - Switzerland 435, 436
- Bamboo lances, Italy 275
- Battalion commanders, Servia 74
- Batteries of machine guns. (*See* Machine-gun troops.)
- Battery commanders, Servia 73
- Battery, field:
  - Austria-Hungary 92
  - France 92, 93
  - Germany 93
  - Great Britain 94
  - Italy 94
  - Russia 94, 95
- Bean ration of a soldier, Mexico 276
- Beaumont-Vitali rifle Table C
- Bedding appropriations:
  - Austria-Hungary 5
  - France 10
- Bedding stores, appropriations, Austria-Hungary 5
- Belgian bicycles in Japanese army 276
- Belgium:
  - Ammunition supply 217
  - Army strength and composition 7
  - Automatic pistols 171
  - Bicycles, folding 243
  - Budget 7
  - Carrier pigeons 237, 243, 244
  - Field gun 81, 96
  - General staff, strength and composition 7
  - Machine guns 121, 130–132
  - Powders and explosives Table C
  - Rifle Table C
- Belt, ammunition, Japan 370
- Bergmann automatic pistol 172, 173, 174, 176, 177, 179, 180
- Berlin factory, automatic pistols 171
- Bicycle stretcher for wounded, Russia 278, 279
- Bicycles, folding, Belgium 243
- Bicycles for sanitary troops, Russia 278, 279
- Bicycles in maneuvers:
  - France 327
  - Germany 351, 356
  - Japan 375
  - Norway 377, 378
  - Switzerland 412

Page.

- Bicycles in the army, Japan 276
- Bicyclists. (*See* Cyclists.)
- Billeting maneuvers, Germany 350
- Bitting, France 326
- Blagodarnoye district, mobilization experiment, Russia 290, 291
- Blagoveshchensk headquarters, Russia 43
- Blockhouse system of South Africa 259, 261
- Boden garrison, Sweden 74
- Bodyguard:
  - Austria-Hungary 6
  - Servia 73
  - Sweden 75
- Boer field gun 81, 109
- Bolivia, rifle Table C
- Borchardt automatic pistol 170, 180
- Borchardt-Luger automatic pistol. (*See* Parabellum automatic pistol.)
- Bosphorus fortifications, Turkey 296
- Boulair. (*See* Dardanelles fortifications.)
- Bounties. (*See* Reliefs, rewards, and bounties.)
- Brakes, field guns:
  - Boer 109
  - Darmancier and Dalzon 111, 113
  - France 84
  - Germany 85, 86
  - Krupp 114
- Brazil:
  - Carrier pigeons 237
  - Machine guns 154
  - Powders and explosives Table C, 190
  - Recruiting law 57
  - Rifle Table C
- Bread ration of a soldier, Mexico 276
- Breakfast ration of a soldier, Mexico 276
- Breech closure, field guns and mountain guns:
  - Boer 109
  - Italy 89
  - Japan 97
  - Krupp 114
  - Mexico 99
  - Switzerland 105
- Breeds, carrier pigeons. (*See* Carrier pigeons, breeds and varieties.)
- Brest-Litovsk headquarters, Russia 42
- Brigade commanders, Servia 74
- Brigade districts, Servia 73
- Brigade maneuvers, duration of marches, Russia 287
- Bronze used for field guns, Austria-Hungary 83
- Browning automatic pistol 170, 175, 176
- Budgets:
  - Algeria 10
  - Austria-Hungary 5, 6
  - Belgium 7
  - Denmark 8
  - France 9, 10, 11
  - German colonies 15
  - Germany 15
  - Great Britain 18–22

Page.
Budgets—Continued.
  Italy 33
  Japan 34
  Mexico 36
  Netherlands 37
  Norway 38
  Portugal 39
  Russia 40
  Spain 44, 45
  Sweden 47
  Switzerland 48
  Tunis 10
Building. (*See* Construction and repairs.)
Bulgaria:
  Carrier pigeons 238
  Rifle Table C
Buller's operations, supply and transportation, South Africa, Great Britain 270, 271
Buller's train, South Africa, Great Britain 271
Bursting charges 194
Butter ration of a soldier, Mexico 276
Cabinet, military, Argentina. (*See* Military cabinet, its sections and duties.)
Cadence, Switzerland 437
Cadet corps, Russia 278, 280, 281
Cadet corps, number and distribution of, Russia 280, 281
Cadet corps preparatory school. (*See* Preparatory schools for cadet corps.)
Cadet schools, preparatory. (*See* Preparatory cadet schools.)
Caissons, field artillery:
  Austria-Hungary 92
  France 92, 93
  Germany 93
  Great Britain 94
  Italy 94
  Russia 94, 95
  Spain 102
  Switzerland 108
Caissons, machine guns. (*See* Machine guns, caissons.)
Camels in British campaigns 272
Camp equipment, appropriations:
  Denmark 8
  France 10
Campaign school of the cavalry, Russia 284
Camps of instruction, Russia 286
Canada:
  Powder and explosives Table C
  Rifles Table C, 155, 158–164
Candles for South Africa, Great Britain 270
Canteens, Russia 294
Carbineers, appropriations, Italy 33
Carbineers, strength and composition. (*See* Strength and composition of carbineers.)
Carbine:
  Austria-Hungary 197
  France 201
  Germany 205
  Japan 167, 371
  Russia 214

Page.
Carbine, arm for machine-gun troops, Germany 137
Carbine for infantry officers 157
Carbolic powder, disinfectant, for South Africa, Great Britain 270
Carriages of field guns. (*See* Field-gun carriages.)
Carrier-pigeon associations 235, 236, 237, 238, 239
Carrier pigeons:
  Argentina 237
  Austria-Hungary 237
  Bavaria 238
  Belgium 237, 243, 244
  Brazil 237
  Bulgaria 238
  Denmark 238
  France 231, 235, 248, 249
  Germany 238, 357, 358
  Great Britain 238, 266
  Italy 239
  Java 239
  Netherlands 239
  Portugal 239
  Roumania 240
  Russia 240
  Spain 240
  Sumatra 239
  Sweden 241
  Switzerland 241
  Turkey 241
Carrier pigeons, age 232
Carrier pigeons, balloon service, Austria-Hungary 237
Carrier pigeons, breeds and varieties 232
Carrier pigeons, cavalry service:
  Belgium 243
  France 235, 236, 248
  Russia 240
Carrier pigeons, distances traversed by 234
Carrier pigeons, dovecots for 235, 243, 244
Carrier pigeons, fines for killing of, France 235
Carrier pigeons, food for 233
Carrier pigeons, fortress service 233
Carrier pigeons, fortress service:
  Belgium 243
  France 235, 236, 249
  Germany 238
  Russia 240
  Spain 241
Carrier pigeons, hindrances to flight 234
Carrier pigeons, identification mark, Belgium 243, 244
Carrier pigeons in maneuvers, Germany 357, 358
Carrier pigeons, methods of transporting 236, 248
Carrier pigeons, naval service:
  France 232
  Germany 239
Carrier pigeons, number of:
  Belgium 243
  Germany 238

Page.
Carrier pigeons, preparation of dispatches 231, 233, 244
Carrier pigeons, speed 233, 234
Carrier pigeons, stations 233, 266
Carrier pigeons, stations, distance between 233, 236
Carrier pigeons, training 232, 238
Carrier pigeons, training, instruction in, France 236
Carrier pigeons, transportation 236
Cartography. (*See* Geographical service.)
Cartridge belt, Japan 370
Cartridge pouch:
  Germany 253
  Japan 370
Cartridges, artillery, maneuvers:
  Norway 379
  Switzerland 411
Cartridges, small arms, maneuvers:
  Norway 378, 379
  Switzerland 411, 437
Cartridges, small-caliber rifles of various countries Table C
Cartridges, number carried by soldier:
  Austria-Hungary 197, 217
  Belgium 217
  Denmark 217
  France 200, 217
  Germany 204, 217
  Great Britain 208, 217
  Greece 217
  Italy 212, 217
  Netherlands 217
  Norway 217
  Roumania 217
  Russia 214, 215, 217
  Spain 217
  Sweden 217
  Switzerland 217
  Turkey 217
Cartridges, number in company wagons:
  Austria-Hungary 197
  France 200
  Germany 204
  Great Britain 208
  Russia 214
Case shot:
  Austria-Hungary 92
  Boer 109
  Great Britain 94
  Italy 94
  Russia 94, 95
Caucasian depot cavalry, Russia 65, 66
Caucasian military district, Russia 43
Caucasian military district, cadet corps, Russia 281
Cavalry:
  Algeria 13, 14
  Austria-Hungary 6
  Belgium 7
  British colonies 27
  Denmark 8, 9

Page.
Cavalry—Continued.
  Egypt 7
  France 13, 14
  Germany 17
  Great Britain 24
  India 25
  Italy 34
  Japan 371
  Mexico 36
  Netherlands 37
  Norway 38, 39
  Portugal 40
  Russia 41
  Servia 73
  Spain 45, 46
  Sweden 47
  Switzerland 49, 50
  Tunis 13, 14
Cavalry, ammunition. (*See* Ammunition, cavalry.)
Cavalry appropriation:
  Algeria 10
  Austria-Hungary 5
  France 10
  Italy 33
  Mexico 36
  Norway 38
  Sweden 47
  Switzerland 48
  Tunis 10
Cavalry armament, new, Italy 275
Cavalry bodyguard, strength, Austria-Hungary 6
Cavalry, depot. (*See* Depot cavalry.)
Cavalry equipment, new, Italy 275
Cavalry fencing. (*See* Prize fencing, cavalry.)
Cavalry in maneuvers:
  France 325, 326
  Germany 351, 352
  Japan 371
  Norway 378, 400, 401
  Switzerland 412, 436
Cavalry, line. (*See* Line cavalry.)
Cavalry machine guns. (*See* Machine guns with cavalry.)
Cavalry petards, Mexico 277
Cavalry reorganization. (*See* Reorganization of the cavalry.)
Cavalry schools. (*See* Schools and military education, cavalry.)
Cavalry strength and composition. (*See* Strength and composition of cavalry.)
Cavalry wagons, new model. (*See* Wagons, cavalry, new model.)
Central administration, War department. (*See* War department, war ministry, or war office.)
Central administration, appropriations. (*See* War department, war ministry, or war office, appropriations.)
Chadalja. (*See* Dardanelles fortifications.)

Page.

- Changes in the army. (*See* Reorganization of the army.)
- Changes in the cavalry. (*See* Reorganization of the cavalry.)
- Changes in the infantry. (*See* Reorganization of the infantry.)
- Chaplain service, appropriations:
  - Austria-Hungary 5
  - Germany 15
- Chaplain service, personnel. (*See* Strength and composition of chaplain service.)
- Charges, bursting 194
- Chase and hunt club, Russia 284
- Chase exercises of officers' cavalry school, Russia 283, 284
- Chests, military, appropriations, Germany 15
- Chief of the great general staff, Servia 69
- Chile:
  - Machine guns 154
  - Military service law 58
  - Powders Table C
  - Rifle Table C
- China:
  - Rifle Table C
  - Surgeons' observations on wounds in 244
- Chinese expedition expenditure, Great Britain 22
- Chinese language at the Oriental institute of Vladivostok, Russia 282
- Chino-Japanese course at the Oriental institute of Vladivostok, Russia 282
- Chino-Korean course at the Oriental institute of Vladivostok, Russia 282
- Chino-Manchu course at the Oriental institute of Vladivostok, Russia 282
- Chino-Mongolian course at the Oriental institute of Vladivostok, Russia 282
- Chino-Russian museum at Port Arthur, Russia 282
- Chita headquarters, Russia 43
- Chlorate mixtures 194
- Chlorid of lime, disinfectant for South Africa, Great Britain 270
- Civil dress, officers, Germany 254
- Clothing, appropriations:
  - Algeria 10
  - Austria-Hungary 5
  - Denmark 8
  - France 10, 11
  - Germany 15
  - Great Britain 21, 22, 31
  - Italy 33
  - Japan 34
  - Netherlands 37
  - Portugal 39
  - Russia 40
  - Switzerland 48
  - Tunis 10
- Clothing, cost of, Great Britain 31
- Clothing department, appropriations. (*See* Clothing, appropriations.)

Page.

- Clothing, infantryman, Germany 252
- Cluchague's apparatus for crossing streams, France 250
- Coast artillery:
  - Norway 38, 39
  - Sweden 79
- Cockerill-Nordenfelt field gun:
  - Belgium 96
  - Netherlands 96
  - Sweden 103
- Coffee for South Africa, Great Britain 269
- Coffee ration of a soldier, Mexico 276
- Colombia, rifle Table C
- Colonial forces, appropriation:
  - Germany 15
  - Great Britain 22
- Colt automatic pistol 170, 171
- Colt machine gun 125
- Colt machine gun, Mexico 145
- Colt revolver, United States army model 170
- Columbia livia turbida, carrier-pigeon breed 232
- Combined maneuvers, army and navy:
  - France 299–327
  - Germany 328–359
  - Russia 402–410
- Combined maneuvers in marching, Russia 286–288
- Commander in chief, duties of, Great Britain 266
- Commander of the army, Servia 69
- Commanders of battalions. (*See* Battalion commanders, Servia.)
- Commanders of batteries. (*See* Battery commanders.)
- Commanders of brigades. (*See* Brigade commanders.)
- Commanders of companies. (*See* Company commanders.)
- Commanders of regiments. (*See* Regimental commanders.)
- Commanders of squadrons. (*See* Squadron commanders.)
- Commanders of the various arms, Servia 73, 74
- Commanding officers, appropriations, Austria-Hungary 5
- Comments, maneuvers:
  - France 323–327
  - Germany 346–359
  - Japan 370–375
  - Norway 390–401
  - Russia 408–410
  - Switzerland 435–437
- Commissariat. (*See* Administrative troops, intendants, commissariat, etc.)
- Communication, great general staff section for, Argentina 56
- Communication troops (railway, telegraph, balloon, etc.) appropriation:
  - Algeria 10
  - Austria-Hungary 5
  - France 10
  - Tunis 10

Page.

- Communication troops (railway, telegraph, balloon, etc.), strength and composition. (*See* Strength and composition of communication troops.)
- Communication troops, telegraph company, Turkey 296
- Company ammunition wagons:
  - Austria-Hungary 197
  - France 200, 202
  - Germany 204, 206
  - Russia 214, 215
- Company commanders, Servia 73
- Compassionate allowances. (*See* Reliefs, rewards, and bounties.)
- Compensation. (*See* Reliefs, rewards, and bounties.)
- Composition of the army. (*See* Strength and composition of army.)
- Concentration, great general staff, section for, Argentina 56
- Condensed milk for South Africa, Great Britain 269
- Conscription. (*See* Military service.)
- Conscription, appropriation. (*See* Recruiting, conscription, etc.)
- Construction and repairs, military appropriations:
  - Austria-Hungary 5
  - France 11
  - Germany 15
  - Great Britain 21, 22
  - Italy 33
  - Japan 34, 35
  - Mexico 36
  - Netherlands (completion of the system of fortifications) 37
  - Portugal 39
  - Russia 40
  - Switzerland 48
- Convicts. (*See* Prisons, military.)
- Convoys, appropriations, France 10
- Cordite 185, 186, 187, 188
  - Austria-Hungary 186, 189, 191
  - Canada Table C
  - Great Britain Table C, 186, 189, 191
  - M. D. Great Britain 186
- Corps ammunition parks:
  - Austria-Hungary 197, 198, 200
  - France 200, 203, 204
  - Italy 213
- Corps of pages, Russia 281
- Cossacks, changes in organization, Russia 68
- Cour de repetition, Switzerland 52
- Courses for aspirant reserve officers, Chile 59
- Cover, taking advantage of, infantry, maneuvers, Norway 397
- Cradles of field guns. (*See* Field-gun carriages.)
- Cresylite 194
- Crossing rivers:
  - France 251
  - Germany 251, 252
  - Russia 284–286, 288

Page.

- Crossing rivers by cavalry, Russia 284–286
- Crossing rivers by infantry, Germany 251
- Crossing streams:
  - France 250, 251
  - Germany 251, 252
  - Russia 288
- Crossing the Niemen by cavalry, Russia 284–286
- Curriculum of Oriental school of Vladivostok, Russia 282
- Cyclist companies, France 247
- Cyclist infantry operations at Aldershot, Great Britain 262–265
- Cyclists:
  - France 247, 327
  - Germany 356
  - Great Britain 261, 262–265
  - Japan 276, 375
  - Norway 38, 377, 378, 392, 393
  - Switzerland 412
- Cyclists for South Africa, Great Britain 261
- Cyclists, reconnoitering service, Japan 276
- Daimler automobiles, Switzerland 219
- Dalzon. (*See* Darmancier and Dalzon.)
- Dardanelles fortifications, Turkey 296
- Darmancier and Dalzon field guns:
  - Mexico 98
  - Spain (Saint Chamond) 102
- Darmancier and Dalzon field guns, mountain guns, and howitzers 110–114, 118
- Denmark:
  - Ammunition 217
  - Budget 8
  - Carrier pigeons 238
  - Field gun (new), appropriation for 96
  - General staff, strength and composition 9
  - Machine guns 133
  - Powders Table C
  - Rifle Table C
  - Strength and composition of the army 8, 9
- Department of rolls and accounts, Mexico 36
- Department of war. (*See* War department, war ministry, or war office.)
- Depot cadres. (*See* Depot cavalry.)
- Depot cavalry Russia 65
- Depot cavalry brigades 65
- Depot cavalry, duties of, Russia 67
- Depot cavalry in war, Russia 67
- Depot cavalry of the guard, Russia 65
- Depot cavalry officers. (*See* Officers of depot cavalry.)
- Depot cavalry regiments, Russia 66
- Depot troops, Sweden 74
- Dinner ration of a soldier, Mexico 276
- Disciplinary companies:
  - Algeria 13
  - France 13
  - Italy 34
  - Russia 41
  - Tunis 13
- Discipline:
  - Germany 351
  - Japan 375

Page.

- Disinfectants for South Africa, Great Britain 270
- Distribution of the army:
  - Algeria 13, 14
  - France 13, 14
  - Great Britain and British Empire 27
  - Russia 41–43
  - Tunis 13, 14
- Districts. (*See* Headquarters, territorial and local.)
- Division ammunition parks and columns:
  - Austria-Hungary 197, 198, 199
  - France 200, 202, 203, 204
  - Germany 208
  - Great Britain 209
  - Italy 213
  - Russia 214, 217
- Division maneuvers, duration of marches, Russia 287
- Divisions of the great general staff, Servia 69
- Don cadet corps, Russia 280
- Don Cossacks 42
- Don military district, Russia 42
- Dorpat headquarters, Russia 41
- Dovecots for carrier pigeons. (*See* Carrier pigeons, dovecots for.)
- Draft animals of Buller's train, number of, South Africa, Great Britain 270, 272
- Drafted men:
  - Brazil 57
  - Peru 64
- Drafting law. (*See* Military law.)
- Dragoons, Austria-Hungary 9
- Drill grounds, appropriation, Norway 38
- Drill regulations, field artillery:
  - France 84
  - Germany 86
- Drill regulations, infantry, new, France 247
- Drills, appropriation, Norway 38
- Drills of reserve and militia:
  - Russia 40, 288–294
  - Switzerland 50, 53
- Druzhina, unit of territorial reserve, Russia 289, 290, 291
- Duties of the commander in chief, Great Britain 266
- E. C. powder 193
- East Africa (German) machine guns 135
- East-African protectorate, appropriation, Germany 15
- Eastern Chinese railway forts, Russia 282, 283
- École centrale, Switzerland 52
- École des cadres, Switzerland 52
- École polytechnique, military section, Switzerland 51
- Ecrasite 194
- Ecuador, machine guns 154
- Education and educational institutions. (*See* Schools and military education.)
- Effective strength. (*See* Strength and composition of army.)

Page.

- Ehrhardt field gun, adopted, Norway 101, 102
- Ehrhardt field gun, purchase of, Great Britain 87
- Ehrhardt field gun, 7.62-cm., 1900, numerical date 118
- Ehrhardt field gun, tests:
  - Austria-Hungary 82, 83
  - Germany 85
  - Great Britain 87
  - Netherlands 96
  - Norway 101
- Ekaterinodar headquarters, Russia 43
- Eight-and-seven-tenth-centimeter field guns:
  - Austria-Hungary 92
  - Italy 94
  - Russia 94, 95
- Eight-centimeter field gun, France 93
- Eight-centimeter mountain gun, Darmancier and Dalzon 113
- Élite, Switzerland 49, 50
- Endurance, soldier, France 328
- Engelhardt field gun, Russia 90
- Englehardt field-gun carriage, Russia 90
- Engineer school. (*See* Schools, and military education, engineers.)
- Engineer stores and works, Italy 33
- Engineer troops:
  - Norway 38, 39, 393
  - Sweden 79
  - Turkey 296
- Engineer troops, strength and composition. (*See* Strength and composition of engineer corps and troops.)
- Engineer, ammunition. (*See* Ammunition, engineers.)
- Engineers, appropriations:
  - Algeria 10
  - Belgium 7
  - France 10, 11
  - Germany 15
  - Italy 33
  - Mexico 36
  - Netherlands 37
  - Norway 38
  - Spain 44
  - Tunis 10
- Engineers, increase, Sweden 79
- Engineers, maneuvers, Norway 393
- England. (*See* Great Britain.)
- Enlisted men, number of. (*See* Strength and composition of army.)
- Equipment, appropriation:
  - Algeria 10
  - France 10
  - Germany 15
  - Italy 33
  - Norway 38
  - Russia 40
  - Switzerland 48
- Equipment of the army, Japan 370, 371

Page.
- Equipment of the cavalry:
  - Germany 351
  - Italy 275
  - Japan 371
- Equipment of the cavalry, weight of, Germany 351
- Equipment of the infantry:
  - Germany 252, 253, 352
  - Japan 370
  - Switzerland 411
- Equipment of the infantry, weight of:
  - Germany 252
  - Switzerland 411
- Equipment of the expeditionary corps to China, new, Germany 253, 254
- Erzerum fortifications, Turkey 297
- Establishments, military, appropriations, Italy 33
- Exemptions from the military service:
  - Brazil 57, 58
  - Chile 58
  - Netherlands 60
  - Peru (supernumeraries and reserves) 64, 65
- Exercises in crossing rivers. (*See* Crossing rivers.)
- Exercises of Alpine troops, winter, Italy 274
- Exercises of cyclist infantry, Great Britain 262–265
- Exercises of landsturm contingent, Servia 73
- Exercises of militia, Netherlands 59
- Exercises of officers' cavalry school, Russia 283–286
- Exercises of the reserve:
  - Chile 59
  - Germany (maneuvers) 329, 352
  - Russia (territorial reserve) 288–294
  - Servia 72, 73
- Exercises of the school contingent, Servia 73
- Expeditionary corps to China, new equipment, Germany 253, 254
- Expeditions, appropriation. (*See* War expenditures.)
- Expenditures, army. (*See* Army expenditures.)
- Expenditures, extraordinary. (*See* Extraordinary expenditures.)
- Expenditures, miscellaneous. (*See* Miscellaneous expenditures.)
- Expenditures of war. (*See* War expenditures.)
- Expenditures, secret. (*See* Secret expenses.)
- Experimental mobilization in the Caucasus, Russia 288–294
- Explosive projectiles, caliber permitted in civilized warfare 120
- Explosives. (*See* Powders and explosives.)
- Extra age allowances, Norway 38
- Extra pay, appropriation, Norway 38
- Extraordinary expenditures, appropriations:
  - Austria-Hungary 6
  - Belgium 7
  - France 11

Page.
- Extraordinary expenditures, appropriations—Continued.
  - Germany 15
  - Great Britain (temporary increases) 19
  - Italy 33
  - Japan 35
  - Netherlands 37
  - Norway 38
  - Portugal 39
  - Russia 40
- Factories, Switzerland 48
- Falcons, experiments with 232
- Fencing, cavalry, Russia 277, 278
- Fencing prizes, cavalry, Russia 277, 278
- Field artillery:
  - Argentina 96
  - Austria-Hungary 82, 92, 198, 199
  - Belgium 96
  - Denmark 96
  - France 84, 92, 93, 201, 202, 203
  - Germany 85, 93, 205, 207
  - Great Britain 87, 94, 209, 211
  - Netherlands 96
  - Italy 88, 94, 213
  - Japan 97
  - Mexico 97–101
  - Norway 101
  - Russia 90, 94, 95, 216, 217
  - Spain 102
  - Sweden 103, 104
  - Switzerland 105, 108
- Field artillery, appropriations:
  - Austria-Hungary 5
  - Italy 88
  - Norway 38
  - Russia 40
- Field-artillery caissons. (*See* Caissons, field artillery.)
- Field-artillery regulations, France 84
- Field artillery, strength and composition. (*See* Strength and composition of field artillery.)
- Field-artillery wagons. (*See* Wagons, field artillery.)
- Field equipment of the infantry. (*See* Infantry field equipment.)
- Field-gun carriages:
  - Austria-Hungary 92
  - Boer 109
  - Darmancier and Dalzon 98, 102, 111–113
  - France 92, 93
  - Germany 93
  - Great Britain 94
  - Italy 94
  - Krupp 114, 116
  - Russia 94, 95
  - Spain 102
  - Sweden 103
  - Switzerland 107, 108
- Field guns:
  - Argentina 96
  - Austria-Hungary 82, 92, 198
  - Belgium 81, 96

Page.

Field guns—Continued.
  Boer 109
  Cockerill-Nordenfelt 96, 103
  Darmancier and Dalzon 98, 110, 111, 112, 118
  Ehrhardt 82, 96, 101, 118
  France 81, 84, 92, 93, 201, 326, 327
  Germany 81, 85, 93, 205, 352
  Great Britain 87, 94, 209
  Italy 81, 88, 89, 90, 94, 213
  Japan 82, 97, 370, 371
  Krupp 96, 102, 103, 104, 114–118, 436
  Mexico 97–101
  Mondragon 97, 98
  Norway 81, 82
  Russia 81, 90, 94, 95, 216
  Saint Chamond 102, 103
  Schneider & Co 96, 102, 103, 327
  Skoda 82
  Spain 102
  Sweden 103, 104
  Switzerland 105, 108, 118, 436
  Thiele 82
  Vickers' Sons & Maxim 102
Field guns, tables of data:
  Austria-Hungary 92
  Darmancier and Dalzon 118
  Ehrhardt 118
  France 92, 93
  Germany 93
  Great Britain 94
  Italy 94
  Krupp 118
  Russia 94, 95
  Sweden 103
  Switzerland 118
Field howitzers and mortars:
  Austria-Hungary 82
  Darmancier and Dalzon 111, 113
  France 82
  Germany 82, 86, 93, 205
  Great Britain 82
  Italy 82, 90
  Mexico 82
  Russia 95
  Sweden 82
Field material, care of, appropriations, Germany 15
Field mortars. (*See* Field howitzers and mortars.)
Fifteen-centimeter field howitzer, Germany 86, 93
Fifteen-centimeter field mortar, Russia 95
Fifteen-pounder, Great Britain 87, 94
Fil-Bouramou. (*See* Bosphorus fortifications.)
Filite, Italy 192
Financial secretary's department, Great Britain 268
Finland cadet corps, Russia 280
Finland military district, Russia 41
Finnish dragoon regiment reorganized, Russia 68
Firing at a balloon, Germany 252

Page.

Firing device, French field gun 85
Firing line, how supplied.
  Austria-Hungary 198, 199
  France 203, 204
  Germany 205, 207
  Great Britain 209, 210, 211, 212
  Italy 213
  Russia 215, 216, 217
Five-inch gun, Great Britain 87
Five-inch howitzer, Great Britain 87, 94
Flags, carried by troops, Germany 330
Fleck, A., on automatic pistols, quoted 171, 172
Fleury rifle, Switzerland 169
Foden traction engines 223, 224, 228, 229, 230
Folding bicycle, Belgium 243
Food of carrier pigeons. (*See* Carrier pigeons, food for.)
Food supply, maneuvers, Germany 349
Foot artillery. (*See* Fortress artillery.)
Forage, appropriations:
  Algeria 10
  Belgium 7
  France 10
  Great Britain 22
  Italy 33
  Portugal 39
  Russia 40
  Tunis 10
Formosa insurgents, expenses of pacification, Japan 35
Fortifications. (*See* Fortresses and fortifications.)
Fortress artillery:
  Algeria 14
  Austria-Hungary 6
  British colonies 27, 31
  Denmark 8
  France 14
  Germany 17
  Great Britain 19, 24, 26
  India 25
  Italy 34
  Japan 35
  Netherlands 37
  Norway 38, 39
  Portugal 40
  Russia 41
  Spain 46
  Sweden 47
  Tunis 14
Fortress artillery, appropriations:
  Austria-Hungary 5
  Norway (coast artillery) 38
  Russia 40
  Sweden (fortress troops) 47
Fortress artillery, strength and composition. (*See* Strength and composition of fortress artillery.)
Fortress carrier pigeons. (*See* Carrier pigeons, fortress service.)
Fortresses and fortification, Turkey 296, 297

Page.

- Fortresses and fortification, appropriations:
  - Denmark 8
  - France (armament of garrisons and coasts) 11
  - Germany (construction and maintenance of forts) 15
  - Italy 33
  - Japan 35
  - Mexico 36
  - Netherlands 37
  - Norway 38
  - Portugal 39
  - Sweden 47
  - Switzerland 48
- Fortresses and fortification, department of the inspector general of, Great Britain 267, 268
- Forts along the Eastern Chinese railway, Russia 282, 283
- Four-and-seven-tenth-inch gun, Great Britain 87
- Fowler traction engines 219, 357
- France:
  - Algiers school of engineers 249
  - Ammunition columns and parks 200, 202, 203, 204
  - Ammunition, how distributed 200, 202, 203, 204
  - Ammunition supply in field 202, 203
  - Ammunition wagons and carts 200, 202, 203
  - Army, strength, composition, and distribution 11–14
  - Artillery ammunition, how replenished 204
  - Budget 9, 10
  - Carbine 201
  - Carrier-pigeon service 231, 235, 249
  - Carrier pigeons 231, 235, 248
  - Cartridges carried in company carts 200
  - Cartridges, number carried by soldiers, 200, 217
  - Columns, ammunition 200, 202, 203, 204
  - Company ammunition carts 200, 202, 203
  - Corps ammunition parks 200, 202
  - Creation of a school of engineers at Algiers 249
  - Crossing rivers 251
  - Crossing streams 250
  - Cyclist companies 247
  - Drill regulations, infantry, new 247, 248
  - Engineers' school created at Algiers 249
  - Field guns 82, 84, 85, 92, 93, 201
  - Field howitzers 82
  - Firing line, how supplied 203, 204
  - General staff, strength and composition 11
  - Grand maneuvers 300–328
  - Horse tournaments, military 246, 247
  - Howitzers 82
  - Infantry drill regulations, new 247, 248
  - Infantry schools, regimental, instituted 249, 250
  - Lebel rifle Table C, 156, 200
  - Machine guns 133–135

Page.

- France—Continued.
  - Maneuvers 299–328
  - Mechanical transportation 219
  - Powders and explosives Table C, 189, 190, 191, 192, 194
  - Recruit contingent for 1900 245, 246
  - Regimental infantry schools instituted, 249, 250
  - Regulations for 7.5-cm. rapid-fire field gun 84
  - Revolvers 201
  - Rifle Table C, 155, 156, 200
  - River, crossing 251
  - Schools, military 12, 249, 250
  - Strength and composition of the army 11–14
  - Supply of ammunition in the field 200, 202, 203
  - Telescope for battery 84
  - Traction engines 219
- Fresh-meat ration of a soldier, Mexico 276
- Fuze setter used with 7.5-cm. field gun, France 84
- Garde republicaine, strength and composition, France 14
- Gardner machine gun 121
- Gardner machine gun:
  - Denmark 132
  - Italy 143
- Garrison artillery. (*See* Fortress artillery.)
- Garrisons. (*See* Headquarters, territorial and local.)
- Garrisons, appropriation:
  - France 11
  - Germany 15
- Gatling machine gun 119, 121, 144
- Gatling machine guns:
  - Japan 144
  - United States 154
- Gendarmerie, appropriations:
  - France (Tunis) 10
  - Japan 34
  - Russia 40
- Gendarmerie, strength and composition. (*See* Strength and composition of gendarmerie.)
- General staff, admission to. (*See* Appointment to general staff.)
- General staff, appropriations:
  - Algeria 10
  - France 10
  - Germany 15
  - Great Britain 22
  - Mexico 36
  - Netherlands 37
  - Norway 38
  - Portugal 39
  - Spain 44
  - Sweden 47
  - Tunis 10
- General staff, changes in:
  - Servia 69, 70
  - Sweden 75

Page.

- General staff committee, Servia 70
- General staff, great:
  - Argentina 56
  - Servia 69, 70
  - Turkey 295, 296
- General staff, great, chief of. (*See* Chief of the great general staff.)
- General staff, great, divisions:
  - Argentina 56
  - Servia 69, 70
- General staff, great, scope of, Servia 70
- General staff officers, promotions. (*See* Promotions of officers of the general staff.)
- General-staff school. (*See* War school.)
- General staff, strength and composition. (*See* Strength and composition of general staff.)
- Generals, number of:
  - France 11
  - Spain 45
  - Sweden 47
- Geodesy, great general staff, Servia 70
- Geographical division, great general staff, Servia 70
- Geographical institute, military:
  - Argentina 56
  - Austria-Hungary 6
  - Italy 34
  - Servia 70
- Geographical institute, military, appropriations:
  - Austria-Hungary 5
  - Denmark (topographical department) 8
  - Italy 33
- Geographical service (military maps, topography, survey, etc.), appropriations:
  - Algeria 10
  - Austria-Hungary 5
  - Denmark 8
  - France 10, 11
  - Germany 15
  - Italy 33
  - Japan 34
  - Netherlands 37
  - Servia 69, 70
  - Switzerland 48
- German military treaties translated into Turkish 296
- Germany:
  - Ammunition columns and parks 204, 205, 208
  - Ammunition supply in field 204, 205, 206, 207, 208
  - Ammunition wagons 204, 205, 206, 207, 208
  - Army, strength and composition 17
  - Artillery ammunition, how replenished 207, 208
  - Automatic pistol 171
  - Automobiles 219
  - Balloon fired at 252
  - Budget 15
  - Carbine 205
  - Carrier pigeons 238

Page.

- Germany—Continued.
  - Cartridges carried on person 204, 217
  - Cartridges, number in company wagons, 204
  - Cavalry telegraphers' school 254, 255
  - Civil dress of officers 254
  - Company ammunition wagons 204, 205
  - Crossing a river by swimming, by an infantry regiment 251, 252
  - Expeditionary corps to China, new equipment 253, 254
  - Field equipment of the infantry 252, 253
  - Field guns 81, 85, 86, 93, 205
  - Field howitzers 82, 86, 93, 205
  - Firing at a balloon 252
  - Firing line, how supplied 206, 207
  - General staff, strength and composition 17
  - Howitzers 82, 86, 93, 205
  - Infantry, field equipment 252, 253
  - Machine guns 135–138
  - Maneuvers 328–360
  - Mannlicher rifle 204
  - Mauser rifle Table C, 204
  - Mechanical transportation 219
  - New equipment of the expeditionary corps to China 253, 254
  - New tendencies in the German army 256–258
  - Officers' dress, Germany 254
  - Parks, ammunition 204, 208
  - Pistol, automatic 171
  - Powders and explosives Table C, 93, 187, 189, 190, 193, 194
  - Revolvers 205
  - Rifles Table C, 156, 204
  - River, crossing 251, 252
  - School for cavalry telegraphers 254
  - School, military technical 255
  - Signaling 255, 256
  - Strength and composition of the army 17
  - Supply of ammunition in the field 204, 205, 206, 207, 208
  - Technical high school, new military 255
  - Telegraphers' school 254
  - Traction engines 219
  - Transportation of men in case of mobilization 256
  - Wagons, ammunition 204, 205, 206, 207, 208
  - Weight of equipment carried by soldier 252
- Gibraltar, shipment of mules for South Africa 270
- Granatfüllung, Germany 194
- Granatfüllung shell. (*See* High-explosive shell.)
- Grand maneuvers. (*See* Maneuvers.)
- Great Britain:
  - Adjutant general's department 266, 267
  - Ammunition carts and wagons 208, 209, 210, 211, 212
  - Ammunition columns and parks 209, 210, 211, 212
  - Ammunition supply in the field 208, 209, 210, 211
  - Armored train used in Boer war 272, 273, 274

Page.

Great Britain—Continued.
  Army, strength, composition, and distribution 24–27
  Artillery ammunition, how replenished 211, 212
  Blockhouse system in South Africa 259–261
  Budget 18–22
  Carrier pigeons 238, 266
  Cartridges carried by soldiers 208, 217
  Cartridges for machine guns 208
  Cartridges in company ammunition wagons 208
  Columns, ammunition 209, 210, 211, 212
  Commander in chief, duties of 266
  Cyclist infantry operations at Aldershot 262–265
  Cyclists for South Africa 261
  Duties of the commander in chief 266
  Ehrhardt field gun 87
  Field guns 82, 87, 94, 209
  Field howitzers 82, 87, 94
  Financial secretary's department 268
  Fortifications, department of the inspector general of 267, 268
  General staff, strength and composition 23, 24
  Guns used in South Africa 87
  Heavy guns 88
  Howitzers 82, 87, 88, 94
  India, troops serving in 25, 61
  Kaffir garrisons in blockhouses 261
  Lee-Enfield rifle Table C
  Lee-Metford rifle Table C, 156, 157
  Machine-gun troops 88
  Machine guns 87, 88, 138–143, 208
  Mechanical transportation 219–230
  Medical department, department of the director general of 268
  Military secretary's department 267
  Mobilization and military intelligence department of the director general 267
  Mountain howitzer, recommended 88
  New standards of height of recruits 265
  Ordnance, department of the director general of 268
  Pompom, 1.37-cm. Maxim 87, 119
  Pompom troops 88
  Powders and explosives Table C, 94, 186, 189, 191, 193, 194
  Quartermaster general's department 267
  Recruits, standard height 265
  Reorganization of the army 18, 19, 20, 24, 25, 26, 61
  Rifles Table C, 156–166
  Ross straight-pull magazine rifle 158–161
  Strength and composition of the army 24–27
  Supplies and transports of the English army in South Africa 219, 230
  Supply of ammunition in the field 208, 209, 210, 211
  Traction engines 219–230
  Wagons, ammunition 208, 209, 210, 211, 212

Page.

Great Britain—Continued.
  War dogs 265
  War office administration, new order in council 266–269
  Water cart 265, 266
Great general staff. (*See* General staff, great.)
Greece:
  Cartridges carried on soldier 217
  Powders and explosives Table C
  Rifles Table C, 166
Grodno headquarters, Russia 42
Guard, cavalry of the. (*See* Depot cavalry of the guard.)
Guards, appropriation, Norway 38
Gun carriages. (*See* Field-gun carriages.)
Gun-cotton powders. (*See* Nitrocellulose powders.)
Guns, field. (*See* Field guns.)
Guns, manufacture of, Russia 40
Guns, mountain. (*See* Mountain guns.)
Guns, number of:
  Denmark 8
  Japan 35
  Spain 45
Hardtack for South Africa, Great Britain 269
Harris magazine 160, 164
Headquarters and higher commands, appropriations:
  Austria-Hungary 5
  Germany 15
  Mexico 36
Headquarters and higher commands, strength and composition:
  Austria-Hungary 6
  Denmark 8
  Germany 15
  Portugal 39
Headquarters, territorial and local:
  Russia 41–43
  Sweden 74
Headquarters, territorial and local, appropriations:
  Austria-Hungary 5
  Germany (governors of fortified places and their staffs) 15
  Mexico 36
  Russia 40
Headquarters, territorial and local, personnel:
  Austria-Hungary 6
  Belgium (provincial and local staffs) 7
Heavy artillery:
  Great Britain 88
  Italy 90
Heavy field howitzer:
  Germany 86, 93
  Great Britain 88
Helsingfors, headquarters, Finland, Russia 41
Herstal, Belgium, manufacture of automatic pistols 171

Page.
High-explosive shell:
  Austria-Hungary 92
  France 92, 93
  Germany 86, 93
  Russia 95
Higher commands and higher staffs. (*See* Headquarters and higher commands.)
Hindrances, carrier pigeons. (*See* Carrier pigeons, hindrances to flight.)
Hindustani course for officers, Russia 281
Historical division, great general staff, Servia 69
History, military, great general staff, Argentina 56
Holland. (*See* Netherlands.)
Horse-artillery machine guns. (*See* Machine guns with horse artillery.)
Horse artillery, strength and composition. (*See* Strength and composition of horse artillery.)
Horse tournaments, military, France 246, 247
Horses. (*See* Remounts.)
Horses, for transportation of supplies in South Africa, Great Britain 270, 271, 272
Hospitals. (*See* Medical service.)
Hotchkiss machine gun 120, 123
Hotchkiss machine guns:
  Belgium 130-132
  France 132-135
  Norway 146
  Sweden 147, 148
Hotchkiss revolving cannon 120, 154
Howitzers:
  Austria-Hungary 82, 83
  Darmancier and Dalzon 111
  France 82
  Germany 82, 86, 93, 205
  Great Britain 82, 88, 94
  Italy 90
  Mexico 82
  Russia (mortar) 82, 93
  Sweden 82
Howitzers, field. (*See* Field howitzers and mortars.)
Hussars, strength, Austria-Hungary 6
Hydrogen cylinders for balloons, France 327
Imperial military court, appropriations, Germany 15
Imperial military court, personnel, Germany 17
Indemnities, appropriation, Italy 33
India, British troops serving in 25, 61
Infantry:
  Servia 73
  Switzerland 49, 50
Infantry ammunition. (*See* Ammunition, infantry.)
Infantry ammunition wagons. (*See* Ammunition wagons and carts.)
Infantry appropriations:
  Austria-Hungary 5
  France 10
  Italy 33

Page.
Infantry appropriations—Continued.
  Mexico 36
  Norway 38
  Sweden 47
Infantry bodyguard:
  Austria-Hungary 6
  Norway 38
Infantry field equipment, Germany 252, 253
Infantry machine guns. (*See* Machine guns with infantry.)
Infantry in maneuvers:
  France 324
  Germany 352
  Japan 370
  Norway 377, 378, 397, 398, 399
  Switzerland 412, 436, 437
Infantry reorganization. (*See* Reorganization of the infantry.)
Infantry, new training, Italy 274, 275
Infantry schools. (*See* Schools and military education, infantry.)
Infantry, strength and composition. (*See* Strength and composition of infantry.)
Information service, great general staff, Argentina 56
Inspector general of fortifications, Great Britain 267, 268
Instruction camps, Russia 286
Instruction for canteens and stores, Russia 294
Instruction for the reserve, Chile 59
Instruction in ballooning for officers, Russia 278
Instruction in schools. (*See* Schools and military education.)
Intelligence, department of the director general, Great Britain 267
Intendance, commissaries. (*See* Administrative troops.)
Intendance service, strength and composition. (*See* Strength and composition of administrative troops.)
International law, status of whites forming the cadre of a troop of Kaffirs, Great Britain 261
Interpreters, number of, France 12
Intrenching tools, infantry, Japan 370
Invalids, Italy 33
Invalids, appropriation for. (See Reliefs, rewards, and bounties.)
Irkutsk preparatory cadet school, Russia 281
Italian mules for South Africa, Great Britain 270
Italy:
  Alpine troops, winter exercises 274
  Ammunition allowance for war 212
  Ammunition, artillery 89, 90, 94, 213
  Ammunition columns 212, 213
  Ammunition park, corps 213
  Ammunition supply in action 212, 213
  Ammunition supply in the field 212, 213
  Armament and equipment of cavalry, new 275
  Army, strength and composition 34

Page.

Italy—Continued.
- Artillery ammunition 89, 90, 94, 213
- Artillery, heavy 90
- Budget 33
- Carbine 212
- Carrier pigeons 239
- Cartridges carried by soldier 212, 217
- Cavalry armament and equipment, new 275
- Corps ammunition parks 213
- Field guns, 81, 88, 89, 90, 94, 213
- Field howitzers 82, 90
- Firing line, how supplied 212, 213
- General staff, strength and composition 34
- Heavy artillery 90
- Howitzers 82, 90
- Infantry, new training 274
- Lances, bamboo 275
- Machine guns 143
- Mountain guns 90, 213
- Mannlicher-Carcano rifle Table C, 166, 212
- New equipment and armament of cavalry 275
- New training of infantry 274
- Powders and explosives Table C, 94, 186, 189, 191, 192
- Rifles Table C, 166, 212
- Strength and composition of the army 34
- Supply of ammunition in action 212, 213
- Winter exercises of the Alpine troops 274

Jäger zu Pferde. (*See* Mounted rifles.)

Japan:
- Ammunition 370, 371
- Army officers abroad 275, 276
- Army, strength and composition 35
- Bicycles 276, 375
- Budget 34
- Cartridge-box belt 370
- Field guns 97
- Machine guns 144
- Maneuvers 360–376
- Murata, 30th Meiji, rifle Table C, 167
- Powders and explosives Table C, 190
- Revolvers 168
- Rifle Table C, 167

Japanese language at the Oriental institute of Vladivostok, Russia 282

Java, carrier pigeons 239

Judge-Advocate General's Department. (*See* Justice, military.)

Justice, military, appropriations:
- Austria-Hungary 5
- France 10
- Germany 15
- Italy 33
- Japan (legal expenses and convicts) 34
- Mexico 36
- Norway 38
- Portugal 39

Justice, military; personnel, Austria-Hungary 6

Page.

Kaffir garrisons in South African blockhouses, Great Britain 261

Kaiser Wilhelm Academy, changes, Germany 16

Kamerun protectorate, appropriations, Germany 15

Karlsborg garrison, Sweden 74

Karlskrona garrison, Sweden 74

Kazan military district, Russia 42

Kazan military district, cadet corps, Russia 281

Khabarovsk headquarters, Russia 43

Khabarovsk cadet corps, Russia 278, 280, 281

Khabarovsk preparatory school, Russia 278

Kharkof, headquarters, Russia 42

Kiauchau protectorate, appropriation, Germany 15

Kief, headquarters, Russia 42

Kief military district, Russia 42

Kief military district, cadet corps, Russia 280

Kiretch-Keni. (*See* Bosphorus fortifications.)

Kitchen, traveling; maneuvers, Norway 393

Korean language at the Oriental institute of Vladivostok, Russia 282

Koum-Kalesi. (*See* Dardanelles fortifications.)

Krag-Jörgensen rifle Table C, 155

Kropatschek carriage for field gun, Austria-Hungary 82

Kropatschek rifle Table C

Krupp field-gun ammunition, Argentina 96

Krupp field guns:
- Germany (tests) 85
- Japan 97
- Netherlands 96
- Spain 102
- Sweden 103, 104
- Switzerland 105

Krupp rapid-fire field gun. (*See* Krupp field guns.)

Krupp rapid-fire mountain gun 117, 118

Kuban Cossacks 43

Kwangtung military district 43, 280

Kwangtung peninsula, appropriation, Russia 40

Lamacchia rifle 155

Lances, bamboo, Italy 275

Landsturm, appropriation:
- France (territorial army) 10
- Norway 38
- Switzerland 48

Landsturm, exercises. (*See* Exercises of landsturm contingent.)

Landwehr:
- Netherlands 60
- Norway 38, 39
- Switzerland 50

Language courses for officers, Oriental, Russia 281, 282

Law, military. (*See* Military law.)

Lebel rifle Table C, 155, 156, 200

Lee-Enfield rifle Table C

Page.
Lee-Metford rifle ... Table C, 156, 157
Leitwell breech closure ... 114
Lemon juice for South Africa, Great Britain ... 269
Length of exercises of the reserve. (*See* Exercises of the reserve.)
Length of service:
  Brazil ... 57
  Chile ... 58, 59
  Japan ... 372
  Netherlands ... 60
  Servia ... 71, 72
  Sweden ... 75
  Switzerland ... 48, 53
Length of service, landwehr, Netherlands ... 60
Length of service, reserve, Servia ... 71
Levassor. (*See* Panhard and Levassor automobile.)
Liability to military service. (*See* Military service liability.)
Light field howitzer, Germany ... 86, 93
Limbers, field guns. (*See* Field-gun carriages.)
Limbers, machine guns. (*See* Machine guns, limbers.)
Line cavalry, Russia ... 65, 66
Line cavalry, depot regiments. (*See* Depot cavalry regiments.)
Local headquarters. (*See* Headquarters, territorial and local.)
Lorries, self-propelling. (*See* Traction engines.)
Loss of draft animals, South Africa, Great Britain ... 271
Losses, calculation of, maneuvers, Norway ... 401
Lublin, headquarters, Russia ... 42
Lyddite, Great Britain ... 194
McDougall disinfecting powder, South Africa, Great Britain ... 270
Machine cannon, navy, Germany ... 135
Machine gun defined in contradistinction to rapid-fire guns ... 120
Machine-gun troops (batteries, companies, detachments, or sections):
  Austria-Hungary ... 126, 127
  France ... 134
  Germany ... 16, 17, 135, 136, 137, 353, 354
  Great Britain ... 88, 138, 139, 141, 142
  Italy ... 144
  Japan ... 144
  Mexico ... 145
  Norway ... 146, 377, 378
  Russia ... 146, 147
  Switzerland ... 148–154
Machine-gun troops, carbine:
  Germany ... 137
  Switzerland ... 151
Machine-gun troops, revolver:
  Germany ... 137
  Switzerland ... 151
Machine guns:
  Austria-Hungary—
    Maxim ... 127, 130
    Montigny ... 126
    Skoda ... 122, 127, 128, 129

Page.
Machine guns—Continued.
  Belgium—
    Hotchkiss ... 130–132
    Montigny ... 121
  Brazil ... 154
  Chile ... 154
  Denmark—
    Danish two-barrel ... 132
    Gardner ... 132
  Ecuador ... 154
  France—
    Hotchkiss ... 132–135
    Reffye ... 119, 121
  German East and Southwest Africa—
    Maxim ... 135
  Germany—
    Maxim ... 135–138
  Great Britain—
    Maxim ... 138–143
    Pompom ... 87, 119
    Simpson machine rifle ... 143
  Italy—
    Gardner ... 143, 144
  Japan—
    Gatling ... 144
    Maxim ... 144
  Mexico—
    Colt ... 145
    Maxim ... 145
  Norway—
    Hotchkiss ... 146
    Maxim ... 145, 146
  Russia—
    Maxim ... 146, 147
  Sweden—
    Hotchkiss ... 147, 148
    Maxim ... 147, 148
    Palmcrantz ... 121
  Switzerland—
    Maxim ... 148, 152, 153
  United States ... 154
Machine gun, ammunition, number of rounds carried:
  France ... 132, 135
  Great Britain ... 139, 208
  Russia ... 147
  Switzerland ... 151
Machine guns, automatic ... 120, 122
Machine guns, caissons:
  Germany ... 136
  Great Britain ... 138, 139
  Russia ... 147
  Switzerland ... 151
Machine guns, carriages:
  Austria-Hungary ... 128, 129
  Belgium ... 131, 132
  France ... 134
  Japan ... 144
Machine guns, cavalry regulations on, Great Britain ... 139, 141, 142, 143
Machine guns classified ... 120, 121, 122
Machine guns, Colt. (*See* Colt machine gun.)

Page.
Machine guns, Colt, tests. (*See* Machine guns, tests and experiments.)
Machine guns, experiments. (*See* Machine guns, tests and experiments.)
Machine guns, Gardner. (*See* Gardner machine gun.)
Machine guns, Gatling. (*See* Gatling machine gun.)
Machine guns, Hotchkiss. (*See* Hotchkiss machine gun.)
Machine guns, Hotchkiss revolving cannon. (*See* Hotchkiss revolving cannon.)
Machine guns, Hotchkiss, tests of. (*See* Machine guns, tests and experiments.)
Machine guns in action, Great Britain 140
Machine guns in fortresses:
  Austria-Hungary 127
  Belgium 131
  Denmark 132
  Norway 146
  Russia 146
Machine guns, limbers:
  Austria-Hungary 129
  France 134
  Russia 147
Machine guns, maneuvers:
  Germany 137, 353, 354
  Norway 377, 378, 393
Machine guns, Maxim. (*See* Maxim machine gun.)
Machine guns, Maxim, tests. (*See* Machine guns, tests, and experiments.)
Machine guns, Maxim-Nordenfelt, automatic. (*See* Maxim-Nordenfelt automatic machine gun.)
Machine guns, mounts:
  Austria-Hungary 128, 129
  Belgium 130, 131, 132
  France 132, 133, 134
  Germany 136
  Japan 144
  Switzerland 148, 150, 152
Machine guns, Montigny 121, 126
Machine guns, navy, Germany 135
Machine guns, Nordenfelt. (*See* Nordenfelt machine gun.)
Machine guns, Nordenfelt, tests. (*See* Machine guns, tests, and experiments.)
Machine guns, Nordenfelt, naval. (*See* Nordenfelt naval machine gun.)
Machine guns of caliber 119, 120
Machine guns, operated by hand 120
Machine guns, Palmcrantz. (*See* Palmcrantz machine gun.)
Machine guns, Pompom. (*See* Pompom machine gun.)
Machine guns, Reffye. (*See* Reffye machine gun.)
Machine guns, Salvator and von Dormus. (*See* Skoda machine gun.)
Machine guns' shields:
  Austria-Hungary 128
  France 134

Page.
Machine guns, Simpson machine rifle. (*See* Simpson machine rifle.)
Machine guns, Skoda. (*See* Skoda machine gun.)
Machine guns, tests and experiments:
  Austria-Hungary—
    Maxim 127
    Skoda 127
  Belgium, Hotchkiss 130-132
  Brazil 154
  Chile 154
  Ecuador 154
  France, Hotchkiss 132, 134
  Germany 137
  Great Britain, Simpson machine rifle 143
  Italy 143
  Japan—
    Gatling 144
    Maxim 144
  Norway—
    Hotchkiss 146
    Maxim 145, 146
  Russia, Maxim 146
  Sweden—
    Hotchkiss 147, 148
    Maxim 147, 148
    Nordenfelt 147, 148
  United States—
    Colt 154
    Hotchkiss 154
    Vickers R. C 154
Machine guns, transportation, fourth Gurkha rifles, Great Britain 139
Machine guns, transportation, light carts, Japan 144
Machine guns, transportation, pack:
  Austria-Hungary 127
  France 132, 133, 134
  Italy 144
  Norway 146
  Switzerland 150, 153
Machine guns, transportation, pack on backs of soldiers, Great Britain 138
Machine guns, transportation, wheeled:
  Austria-Hungary 127
  Belgium 132
  France 134
  Germany 137, 359
  Great Britain 138, 139
  Norway 146
  Russia 147
Machine guns, trials. (*See* Machine guns, tests, and experiments.)
Machine guns, tripod mounts:
  Belgium 130, 131, 132
  France 132, 133
  Germany 136
  Switzerland 148, 150, 152
Machine guns, Vickers-Maxim, 3.7-cm. (*See* Pompom machine gun.)
Machine guns, Vickers R. C. automatic. (*See* Vickers R. C. automatic machine gun.)

Page.

Machine guns with Alpine troops, France 134

Machine guns with army corps:
  Germany 135
  Switzerland 148

Machine guns with cavalry:
  Austria-Hungary 127
  France 134
  Germany 135
  Great Britain 139, 141, 142, 208
  Norway 146
  Russia 146
  Switzerland 151

Machine guns with horse artillery, Russia 146

Machine guns with infantry:
  Austria-Hungary 126
  France 134
  Germany 136
  Great Britain 138, 208
  Japan 144
  Mexico 145
  Russia 147

Machine guns with mounted infantry, Great Britain 138, 142, 208

Machine rifle, Simpson. (*See* Simpson machine rifle.)

Madjarkale. (*See* Bosphorus fortifications.)

Magazines:
  Harris 160, 164
  Ross 160

Maintenance. (*See* Subsistence.)

Manchu language at the Oriental institute of Vladivostok, Russia 282

Maneuver marches, Russia 286, 288

Maneuvers:
  France 299–328
  Germany 328–360
  Japan 360–376
  Norway 376–402
  Russia 402–410
  Switzerland 50, 53, 410–437

Maneuvers, appropriations:
  Japan 34
  Norway 38

Maneuvers, combined, of army and navy:
  France 299–328
  Germany 328–360

Maneuvers, grand. (*See* Maneuvers.)

Maneuvers, great general staff section, Argentina 56

Maneuvers in marching, Russia 286–288

Maneuvers in river crossing:
  France 251
  Germany 251, 252
  Russia 284, 285, 288

Maneuvers, medical service:
  Germany 347, 348
  Russia 288

Maneuvers, regimental, Russia 287

Maneuvers, transportation:
  France 219, 300
  Germany 219, 348, 349, 350

Page.

Maneuvers, transportation—Continued.
  Russia 291, 292
  Switzerland 219, 435

Mannlicher automatic pistol 170, 171, 174, 177, 179

Mannlicher-Carcano rifle Table C, 166, 212

Mannlicher rifle Table C, 155, 160, 164, 168, 197, 204

Mannlicher-Shönauer rifle 165

Manufacture of arms and ammunitions, Switzerland 48

Manufacture of automatic pistols:
  Belgium 171
  Germany 171
  Switzerland 171

Manufacture of guns, appropriation, Russia 40

Maps. (*See* Geographical service.)

Marches in Siberia. (*See* Winter marches in Siberia.)

Marches, maneuvers, Russia 286

Marching of infantry, in maneuvers, Japan 370

Maréchaussée, appropriations, Netherlands 37

Marines, appropriation, Mexico 36

Marking of wounded, maneuvers, Norway 402

Martini-Henry, Persia 168

Material, artillery. (*See* Guns, number of.)

Maxim machine gun 119, 122

Maxim machine gun:
  Austria-Hungary 127, 130
  Germany 135, 136
  Great Britain 138, 139, 140
  Japan 144
  Mexico 145
  Norway 145, 146
  Russia 146, 147
  Sweden 147, 148
  Switzerland 148, 152, 153

Maxim machine gun tests. (*See* Machine guns, tests, and experiments.)

Maxim-Nordenfelt automatic machine-gun 154

Maximum range of automatic pistols 170

Maximum range of field guns:
  Austria-Hungary 92
  France 92, 93
  Germany 93
  Great Britain 94
  Italy 94
  Russia 94, 95
  Sweden 103

Mauser automatic pistol 170, 171, 174, 177, 179

Mauser rifle Table C, 166, 204

Meat ration of a soldier, Mexico 276

Meat, tinned, for South Africa, Great Britain 269

Mechanical transportation. (*See* Traction engines.)

Medical service, appropriation:
  Algeria 10
  Austria-Hungary 5
  Belgium 7
  Denmark 8

Page.
Medical service, appropriation—Continued.
  France 10
  Germany 15
  Great Britain 22
  Italy 33
  Mexico 36
  Netherlands 37
  Norway 38
  Portugal 39
  Russia 40
  Spain (hospitals) 44
  Tunis 10
Medical service, department of the director general, Great Britain 268
Medical service, increase of personnel, Sweden 80
Medical service, maneuvers. (*See* Maneuvers, medical service.)
Medical service, personnel. (*See* Strength and composition of the Medical Corps.)
Medical service, scientific senate, Germany 16
Melinite, France 194
Melstrons obturator, Argentina 96
Messing. (*See* Subsistence.)
Mexico:
  Army, strength and composition 36
  Budget 36
  Field guns 97, 98
  Machine guns 97, 98, 145
  Petards for Mexican cavalry 277
  Powders Table C
  Mountain guns 98
  Mountain mortars 82, 98
  Rations of soldier on garrison duty 276
  Rifle Table C
Michael cadet corps, Russia 280
Military cabinet, its sections and duties, Argentina 55
Military chests. (*See* Chests, military appropriations.)
Military construction bureau. (*See* Constructions, bureau of.)
Military districts:
  Great Britain 61
  Russia 41–43
  Servia 73
  Sweden 74
Military educational institutions. (*See* Schools, military.)
Military justice. (*See* Justice, military.)
Military law:
  Brazil 57
  Chile 58
  Japan 372
  Netherlands 59
  Peru 61
  Servia 68
  Sweden 74
  Switzerland 48
Military technical board (*See* Technical board, military)
Military prisons. (*See* Prisons, military.)

Page.
Military sciences and theories, Turkish translation of German military treatises 296
Military secretary's department, Great Britain 267
Military service:
  Brazil 57
  Chile 58
  Japan 372
  Netherlands 59
  Servia 71
  Switzerland 48
Military service law. (*See* Military law.)
Military service, length of. (*See* Length of military service.)
Military service liability:
  Brazil 57
  Chile 58
  Netherlands 60
  Peru 64
  Servia 71, 72
  Switzerland 48
  Turkey 297
Military service of nomadic tribes, Turkey in Asia 297
Military stores. (*See* Stores.)
Military training. (*See* Exercises.)
Militia:
  Great Britain 62
  Netherlands 59, 60
Militia, appropriations:
  Denmark 8
  Great Britain 20, 22
  Norway (landsturm) 38
  Russia 40
  Switzerland 48
Militia council, Netherlands 60
Militia exercises. (*See* Exercises of militia.)
Militia, nomadic tribes, Turkey 297
Militia register, Netherlands 60
Militia reserve, Great Britain 25
Militia, strength and composition. (*See* Strength and composition of militia.)
Milk, condensed, for South Africa, Great Britain 269
Milne traction engines 223, 225, 228, 229
Minister of war. (*See* War minister.)
Minsk, headquarters, Russia 42
Miscellaneous expenditures, appropriations:
  Austria-Hungary 5
  Belgium 7
  Denmark 8
  Germany 15
  Great Britain 19, 22
  Japan 34
  Netherlands 37
  Norway 38
  Portugal 39
  Russia 40
  Spain 44
  Sweden 47
Mobilization, Peru 64, 65

Page.

Mobilization and military intelligence, department of the director general, Great Britain 267

Mobilization experiment in the Caucasus, Russia 288–293

Mobilization, great general staff section for, Argentina 56

Mobilization, transportation of men. (*See* Transportation of men in mobilization.)

Mondragon field gun, Mexico 97, 98

Mongolian language at the Oriental institute of Vladivostok, Russia 282

Montigny machine-gun:

  Austria-Hungary 126

  Belgium 121

Mortars, field. (*See* Field howitzers and mortars.)

Moscow cadet corps, Russia 280

Moscow, headquarters, Russia 42

Moscow military district, Russia 42

Moscow military district, cadet corps, Russia 280

Mountain artillery, strength and composition. (*See* Strength and composition of mountain artillery.)

Mouzin rifle Table C

Mountain guns:

  Darmancier and Dalzon 113, 118

  Italy 90

  Japan 97

  Krupp 117, 118

  Mexico 98

Mountain howitzers:

  Darmancier and Dalzon 113

  Great Britain 88

  Mexico 98, 113

Mounted infantry, machine guns. (*See* Machine guns with mounted infantry.)

Mounted rifle, Germany 16

Mules for South Africa, purchase of. (*See* Purchase of mules for South Africa.)

Mules for transportation of supplies, South Africa, Great Britain 270, 271

Murata, 30th Meiji rifle, Japan Table C, 167

Muzzle velocity, automatic pistols. (*See* Velocity, automatic pistols.)

Muzzle velocity, field guns. (*See* Velocity, field guns.)

National guard, Peru 65

Naples, shipment of mules for South Africa, Great Britain 270

Narrow-gauge railway, South Africa, Great Britain 271

Navy, combined maneuvers of the army and navy:

  France 299, 328

  Germany 328–359

Neckar, swum across by infantry, Germany 251, 252

Nepluyev cadet corps, Russia 281

Netherlands:

  Army, strength and composition 37

  Carrier pigeons 239

Page.

Netherlands—Continued.

  Field guns 96

  Military law 60

  Powders Table C

  Rifles Table C

New Orleans, shipment of mules for South Africa, Great Britain 270

New schools, military. (*See* Schools and military education, new schools.)

New tendencies of the army, Germany 256–258

Nicholas cadet corps, Russia 280

Niemen crossed by cavalry, Russia 284–286

Night operations, maneuvers, Russia 288

Nikolsk-Usurisk, headquarters, Russia 43

Nine-pounder, Great Britain 87

Nitrocellulose powders 185, 187, 188, 189, 190

  B 192

  B. E. C 191

  B. F Table C

  B. N 190, 191, 192

  E. C 193

  Pyrocollodion Table C, 190, 191, 192

  Pyroxylin 186

  Rifleite 194

  Rottweil Table C, 190

  Schultze 191, 193

  Schwab Table C

  Troisdorf Table C, 187, 193

  Various 190

  Wetteren Table C

Nitroglycerin powders 185, 187, 188, 189, 190

  Apirite 191

  Ballistite Table C, 185, 186, 187, 189, 192

  Cordite Table C, 185, 186, 187, 188, 189, 191

  Filite 192

  Prismatic 190

  Solenite Table C, 189, 192

  Various 190

Nizhni-Novgorod cadet corps, Russia 280

Nodal, explosive 195

Nomadic militia, Turkey 297

Noncommissioned officers, appointment of. (*See* Appointment of noncommissioned officers.)

Noncommissioned officers, privileges of, Chile 59

Noneffective services, appropriations, Great Britain 22

Nordenfelt machine gun 122

Nordenfelt machine gun:

  Norway 146

  Sweden 147

Nordenfelt machine gun, tests. (*See* Machine guns, tests and experiments.)

Nordenfelt naval machine gun 121

Norway:

  Army, strength and composition 38, 39

  Budget 38

  Field gun 81, 82, 101, 102

  General staff, strength and composition 39

  Machine guns 145, 146

  Maneuvers 376–402

  Powders and explosives Table C, 188, 189, 192

  Rifle Table C

Page.

Novocherkask cadet corps, Russia.......... 280
Novocherkask headquarters, Russia.......... 42
Novocherkask preparatory school, Russia.......... 280, 281
Number of battalions, batteries, regiments, squadrons, etc. (*See* Strength and composition of army.)
Number of cadet corps, Russia.......... 280, 281
Number of draft animals with Buller, South Africa, Great Britain.......... 270, 272
Number of enlisted men. (*See* Strength and composition of army.)
Number of enlisted men transported to South Africa. (*See* Number of troops transported to South Africa, Great Britain.)
Number of horses, mules, and oxen for transportation of supplies in South Africa, Great Britain.......... 270, 271, 272
Number of horses transported to South Africa, Great Britain.......... 270, 271
Number of mules transported to South Africa, Great Britain.......... 270, 271
Number of officers. (*See* Officers, number of.)
Number of officers in the various arms. (*See* Officers in the various arms, number of.)
Number of recruits:
    Chile.......... 59
    France.......... 245, 246
Number of troops transported to South Africa, Great Britain.......... 270, 271
Number of wagons, South African campaign, Great Britain.......... 271, 272
Obligatory military service. (*See* Military service liability.)
Observations abroad, Japan.......... 275, 276
Observations, maneuvers. (*See* Comments, maneuvers.)
Obstacles in cavalry school exercises, Russia.......... 284
Odessa cadet corps, Russia.......... 280
Odessa headquarters, Russia.......... 42
Odessa military district, Russia.......... 42
Officers abroad. Japan.......... 275, 276
Officers, appointment of. (*See* Appointment of officers.)
Officers, balloonists, Russia.......... 270
Officers' cavalry school, Russia.......... 283
Officers' cavalry school of St. Petersburg, summer exercises at Postavy, Russia.......... 283, 284
Officers' civil dress, Germany.......... 254
Officers in the various arms, number of:
    Algeria.......... 11, 12, 13, 14
    Austria-Hungary.......... 6
    Belgium.......... 7
    Denmark.......... 8, 9
    Dutch East Indies.......... 37
    France.......... 11, 12, 13, 14
    Germany.......... 17, 18
    Great Britain and colonies.......... 23, 24, 25, 26

Page.

Officers in the various arms, number of—Continued.
    India.......... 25, 26, 27
    Italy.......... 34
    Japan.......... 35
    Mexico.......... 36
    Netherlands.......... 37
    Norway.......... 39
    Portugal.......... 40
    Russia.......... 41
    Spain.......... 45
    Sweden.......... 47
    Switzerland.......... 50
    Tunis.......... 11, 12, 13, 14
Officers of depot cavalry, Russia.......... 66
Officers, promotions. (*See* Promotions of officers.)
Officers, retirement of. (*See* Retirement of officers.)
Omsk headquarters, Russia.......... 43
One-pounder, Great Britain.......... 87, 119
Operations, appropriations. (*See* War expenditures.
Operations, great general staff section for:
    Argentina.......... 56
    Servia.......... 69
Operations, South Africa, Great Britain.......... 259-261, 269-274
Opolchenie. (*See* Territorial reserve, Russia.)
Opolchenie, mobilization experiment. (*See* Mobilization experiment in the Caucasus, Russia.)
Orange river, rifle.......... Table C
Ordnance, department of the director general of, Great Britain.......... 268
Ordnance department, appropriations:
    Austria-Hungary.......... 5
    Belgium.......... 7
    Germany.......... 15
    Italy.......... 33
    Netherlands.......... 37
    Norway.......... 38
    Russia.......... 40
Ordre de bataille, maneuvers:
    France.......... Folder opposite 299, 301
    Germany.......... 328, 329
    Japan.......... 361
    Norway.......... 376
    Russia.......... 403, 404
    Switzerland.......... 411
Orel cadet corps, Russia.......... 280
Orenburg cadet corps, Russia.......... 281
Orenburg Cossacks, Russia.......... 42, 68
Orenburg headquarters, Russia.......... 42
Organization and strength of the army. (*See* Strength and composition of army.)
Organization of the army, changes in. (*See* Reorganization of the army.)
Organization of the army, foreign countries.......... 55
Oriental institute of Vladivostok, curriculum, Russia.......... 282

Page.

Oriental language courses for officers, Russia 281, 282
Oskar-Frederiksborg garrison, Sweden 74
Ox carts, South Africa, Great Britain 272
Oxen for transportation of supplies, South Africa, Great Britain 270
Overcoat, cavalry, Italy 275
Overcoat, Iceland Tröje, Norway 394
Pacification of insurgents, appropriations. (*See* War expenditures.)
Pages, corps of, Russia 281
Palmcrantz machine gun, Sweden 121
Panhard and Levassor automobile, Switzerland 219
Parabellum automatic pistol 170, 171, 177, 179
Parma infantry firing school, Italy 274
Parma method of training infantry, Italy, 274, 275
Pay and allowances of the army, appropriations:
  Algeria 10
  Austria-Hungary 5
  Belgium 7
  Denmark 8
  France 10
  Germany 15
  Great Britain 22, 28, 29, 30, 31
  Italy 33
  Japan 34
  Mexico (rolls and accounts) 36
  Netherlands 37
  Norway 38
  Portugal 39
  Russia 40
  Spain 44
  Sweden 47
  Tunis 10
Pay and allowances of officers:
  Great Britain 28, 29, 30
  Netherlands 37
Pay, conscript, Sweden 75
Pay for chief of riding and shooting school, Sweden 80
Penal establishments. (*See* Prisons, military.)
Pensions and allowances, appropriations:
  Algeria 10
  Austria-Hungary 5
  Belgium 7
  France 10
  Great Britain (superannuation allowance) 22
  Italy 33
  Japan (invalids) 34
  Norway 38
  Russia 40
  Spain 44
  Tunis 10
Pensions for retired sergeants, Servia 69
Persia, rifles 168
Peru:
  Military law (reorganization) 64
  Rifle Table C

Page.

Pest affecting draft animals in South Africa campaign 271
Petards, cavalry, Mexico 277
Petards, composition of, Mexico 277
Peter cadet corps, Russia 280
Peugeot automobile, Switzerland 219
Pharmacists. (*See* Medical service.)
Picric acid (bursting charges) 194
Picric-acid powders 195
Pigeon service, carrier. (*See* Carrier pigeons.)
Pigeons, carrier. (*See* Carrier pigeons.)
Pinkeye, South Africa, Great Britain 271
Pioneer material, appropriations, Austria-Hungary 5
Pioneer material depots, personnel, Austria-Hungary 6
Pioneers, appropriations:
  Austria-Hungary 5
  Germany 15
Pioneers, in maneuvers, Germany 352, 353
Pioneers, strength and composition. (*See* Strength and composition of pioneers.)
Pistols, automatic:
  Austria-Hungary 171
  Belgium 171
  Germany 171
  United States 171
Pistols, automatic:
  Bergmann 172, 173, 174, 176, 177, 179, 180
  Borchardt 170, 180
  Borchardt-Luger. (*See* Parabellum.)
  Browning 170, 175, 176
  Colt 170, 171
  Mannlicher 170, 171, 174, 177, 179
  Mauser 170, 171, 177, 179, 180, 182
  Parabellum 170, 171, 177, 179
  Spandau 177, 178, 179
Pistols, automatic, ballistic data. (*See* Ballistic data, automatic pistols.)
Pistols, automatic, classified 171, 172
Pistols, automatic, comment on 180-183
Pistols, automatic, comparative table of 170
Pistols, automatic, velocity. (*See* Velocity, automatic pistols.)
Polytechnical school, military section, Switzerland 51
Polotsk cadet corps, Russia 280
Poltava cadet corps, Russia 280
Pompom machine gun, Great Britain 87, 119
Pompom machine-gun section, Great Britain 88
Pontonnier companies, Turkey 296
Port Arthur Chino-Russian museum, Russia 282
Port Arthur headquarters, Russia 43
Port service, South Africa, Great Britain 270, 271
Portugal:
  Carrier pigeons 239
  Powders Table C, 189
  Rifles Table C, 168
Position artillery, Sweden 77

Page.

- **Postavy**: Summer exercises of officers' cavalry school of St. Petersburg, held at Postavy, Russia 283
- **Powders and explosives**:
  - Austria-Hungary 92, 190
    - Cordite 186, 189, 191
    - Ecrasite 194
    - Prismatic 190
    - Schwab Table C
    - Various gunpowders 190
  - Belgium:
    - Wetteren Table C
  - Brazil Table C, 190
  - Canada:
    - Black Table C
    - Cordite Table C
  - Chile:
    - Troisdorf Table C
  - Denmark:
    - Wetteren Table C
  - France 189, 190
    - B 192
    - B. F Table C
    - B. N 190, 191, 192
    - Cresylite (melinite) 194
    - Various gunpowders 190
  - Germany Table C, 93, 189, 190
    - Granatfüllung (bursting charge) 194
    - Troisdorf 187, 193
    - Various gunpowders 190
  - Great Britain 94, 189
    - B. E. C 191
    - Cordite Table C, 186, 189, 191
    - Cordite, M. D 186
    - Lyddite 194
    - Schultz 191, 193
  - Greece:
    - Black powder Table C, 189
  - Italy 94
    - Apirite 191
    - Ballistite 186, 189, 191, 192
    - Filite 192
    - Solenite Table C, 186, 189, 192
    - Various gunpowders 191
  - Japan Table C, 190
  - Mexico:
    - Nobel 277
    - Rottweil Table C
  - Netherlands:
    - Black Table C
    - Troisdorf Table C
  - Norway 188
    - Ballistite Table C, 189, 192
  - Portugal:
    - Black Table C, 189
  - Roumania:
    - Troisdorf Table C
  - Russia 94, 95, 189
    - Nodal, new explosive 195
    - Pyrocollodion Table C, 191, 192
  - Spain:
    - Rottweil Table C

Page.

- Powders and explosives—Continued.
  - Sweden 186, 187
    - Apirite 191
    - Ballistite 187, 192
    - Troisdorf Table C
  - Switzerland Table C
    - New explosive containing aluminum 195
  - Turkey Table C
    - Rottweil 190
  - United States Table C
  - Various:
    - Chlorate mixtures 195
- Powders and explosives:
  - Black powders Table C, 189
  - Bursting charges 194
  - Chlorate mixtures 195
  - New explosive containing aluminum 195
  - Nitrocellulose 185, 187, 188, 189, 190
    - B 192
    - B. E. C 191
    - B. F Table C
    - B. N 190, 191, 192
    - E. C 193
    - Pyrocollodion Table C, 190, 191, 192
    - Pyroxylin 186
    - Rifleite 194
    - Rottweil Table C, 190
    - Schultze 191, 193
    - Schwab Table C
    - Troisdorf Table C, 187, 193
    - Various 190
    - Wetteren Table C
  - Nitroglycerin 185, 187, 188, 189, 190
    - Apirite 191
    - Ballistite Table C, 185, 186, 187, 189, 192
    - Cordite Table C, 185, 186, 187, 188, 189, 191
    - Cordite, M. D 186
    - Filite 192
    - Nobel 277
    - Prismatic 190
    - Solenite Table C, 186, 189, 192
    - Various 190
  - Nodal, new explosive 195
  - Picric acid (bursting charges) 194
    - Cresylite (melinite) 194
    - Ecrasite 194
    - Granatfüllung 194
    - Lyddite 194
  - Picric-acid powders 195
- Powders and explosives, appropriations for factories of:
  - France 10, 11
  - Switzerland 48
- Powders and explosives, new 195
- Preference positions for noncommissioned officers, Chile 59
- Preliminary maneuvers, France 301
- Preparatory cadet schools, Russia 280, 281
- Prismatic powder, Austria-Hungary 190

Page.
Prisons, military, administrative personnel, Austria-Hungary 6
Prisons, military (convicts, penal establishments, etc.), appropriations:
  Algeria 10
  Austria-Hungary 5
  France 10
  Germany 15
  Italy 33
  Japan 34
  Mexico 36
  Portugal 39
  Tunis 10
Prize fencing, cavalry, Russia 277
Prizes for fencing, cavalry, Russia 277, 278
Probationary service in the general staff, Servia 295
Projectiles, field artillery. (*See* Ammunition, artillery.)
Promotions of enlisted men, Chile 59
Promotions of officers of depot cavalry, Russia 66, 67
Promotions of officers of the general staff, Servia 71
Provincial and garrison staff. (*See* Headquarters, territorial and local.)
Provisions. (*See* Subsistence.)
Pskov cadet corps, Russia 280
Punishments of reserve men, Servia 68, 69
Purchase of mules for South Africa, Great Britain 270
Purchase of remounts, appropriation. (*See* Remounts, appropriation.)
Putilof field gun. (*See* Englehardt field gun.)
Pyrocollodion, Russia Table C, 190, 191, 192
Pyroxylin 186
Quartermaster general's department, Great Britain 267
Quarters, barracks, appropriations:
  Austria-Hungary 5
  Denmark 8
  France 11
  Germany 15
  Great Britain 19
  Italy 33
  Spain 44
Railway, narrow-gauge, South Africa, Great Britain 271
Railway troops. (*See* Communication troops.)
Railways, military appropriations, France 10, 11
Range, maximum, field guns. (*See* Maximum range of field guns.)
Rapid-fire gun defined in contradistinction to machine guns 120
Rapid-fire guns. (*See* Field guns.)
Rapid-fire problem 81, 82
Rapidity of fire, field guns, etc.:
  Darmancier and Dalzon 118
  Ehrhardt 118
  Krupp 118
  Mexico 101
  Switzerland 118

Page.
Ration, breakfast, Mexico 276
Ration, dinner, Mexico 276
Ration of a soldier, Germany 253
Ration of a soldier on garrison duty, Mexico 276
Ration, supper, Mexico 276
Rationing of troops. (*See* Subsistence.)
Ratniki, men of mobilized territorial reserve, Russia 280
Recoil, field guns:
  Italy 89
  Japan 97
  Russia 90
Recoil on the carriage, field guns 81
Reconnaissance service, appropriation, Netherlands 37
Reconnaissance service, great general staff, Argentina 56
Recruiting:
  Brazil 57
  Chile 59
  Netherlands 60
  Switzerland 50
Recruiting, conscription, enlistment, etc., appropriation:
  France 10
  Norway 38
  Russia 40
  Spain 44
Recruiting contingent. (*See* Number of Recruits.)
Recruiting, exemptions. (*See* Exemptions.)
Recruiting law, Brazil 57
Recruits classified, Brazil 57
Recruits, new standards of height, Great Britain 265
Recuperator, field guns:
  Darmancier and Dalzon 111
  Japan 97
  Krupp 114
  Russia 90
Reffye machine gun, France 119, 121, 132
Reffye mitrailleuse. (*See* Reffye machine gun.)
Regimental commanders, Servia 74
Regimental districts, Servia 73
Regimental infantry schools instituted 249, 250
Regimental maneuvers, duration of marches, Russia 287
Regular army. (*See* Strength and composition of army.)
Regulations, drill. (*See* Drill regulations.)
Reliefs, rewards, and bounties; appropriations:
  Austria-Hungary 5
  Belgium 7
  France 10
  Germany 15
  Great Britain 22
  Italy 33
  Japan 35
  Russia 40
  Spain 44

Page.
Remarks, maneuvers. (*See* Comments, maneuvers.)
Remount depot appropriations, Germany 15
Remounts:
  France 325, 326
  Great Britain 269
  Japan 375
  Russia 67
  South Africa 269
  Spain 45
Remounts, appropriations:
  Austria-Hungary 5
  Denmark 8
  France 10
  Germany 15
  Great Britain 22
  Italy 33
  Japan 34
  Spain 44
  Sweden 47
  Switzerland 48
Remounts, depot cavalry, Russia 67
Remounts issued to troops, Russia 67
Remounts, officers', France 326
Remounts, pay of chief of board, Sweden 80
Reorganization, extraordinary expenditure, Austria-Hungary 6
Reorganization of the army and changes in strength and composition:
  Argentina 55
  Austria-Hungary (changes in the strength) 6
  Brazil 57
  Chile 58, 59
  France (changes in the strength) 11
  Germany 16, 17
  Great Britain and colonies 18, 19, 20, 24, 25, 26, 61–64
  India (changes in the strength) 25
  Netherlands 59, 60
  Peru 64
  Servia 68–74
  Sweden 74–80
Reorganization of the artillery and changes in its strength and composition:
  Sweden 77, 78, 79
Reorganization of the cavalry and changes in its strength and composition:
  Russia 65, 66, 67
  Servia 73
Reorganization of the depot cavalry, Russia 65, 66
Reorganization of the engineers, Sweden 79
Reorganization of the general staff, Argentina 56
Reorganization of the infantry and changes in its strength and composition:
  Servia 73
  Sweden 75, 76
Repairs, appropriation. (*See* Construction and repairs.)
Reserve, Peru 64

Page.
Reserve, appropriation:
  France 10
  Japan 34
  Norway (landsturm) 38
  Russia 40
  Switzerland (landsturm) 48
Reserve exercises. (*See* Exercises of the reserve.)
Reserve fund, Russia 40
Reserve, ~~in~~ maneuvers, Germany 329
Reserve, maintenance. (~~*See*~~ Subsistence, reserve men.)
Reserve, military instruction of, Chile 59
Reserve, militia. (*See* Militia reserve.)
Reserve, punishments. (*See* Punishments of reserve men.)
Reserve, strength and composition. (*See* Strength and composition of reserve.)
Retirement of officers, Servia 68
Retirement pension. (*See* Pensions and allowances.)
Review, maneuvers:
  France 323
  Germany 329, 330
  Japan 369, 370
Revolvers:
  Austria-Hungary 197
  France 201
  Germany 205
  Japan 168
  Russia 214
  United States 170
Revolvers, ammunition. (*See* Ammunition, revolver and pistol.)
Revolvers, Colt 170
Revolvers for machine-gun troops, Germany 137
Rewards. (*See* Reliefs, rewards, and bounties.)
Rice ration of a soldier, Mexico 276
Riding, France 326
Rifle societies:
  Servia 73
  Switzerland 48
Rifleite 194
Rifles. (*See* Rifles, small caliber.)
Rifles, appropriations, Austria-Hungary 5
Rifles, automatic, Germany 156
Rifles, automatic, Lamacchia 155
Rifles, Harris magazine 164, 165, 166
Rifles, mounted. (*See* Mounted rifles.)
Rifles, small caliber:
  Beaumont-Vitali Table C
  Gras Table C
  Krag-Jörgensen Table C, 155
  Kropatschek Table C
  Lamacchia 155
  Lebel Table C, 155, 156, 200
  Lee-Enfield Table C, 156, 158, 163
  Lee-Metford Table C, 156, 157, 158
  Mannlicher Table C, 155, 160, 164, 168, 197, 204
  Mannlicher-Carcano Table C, 166, 212

Page.

- Rifles, small caliber—Continued.
  - Mannlicher-Shönauer 165
  - Martini-Henry 158, 168
  - Mauser Table C, 155, 160, 166, 168, 204
  - Mouzin Table C, 214
  - Murata, 30th Meiji Table C, 167
  - Ross 155, 158–164
  - Schmidt Table C
  - Springfield magazine Table C
  - Swiss new rifle 168, 169
- Rifles, small caliber, comparative table of Table C
- Rifles, strength and composition. (*See* Strength and composition of rifles.)
- Riga headquarters, Russia 42
- Rigid carriages for field guns 81
- River crossing:
  - France 251
  - Germany 251, 252
  - Russia 284, 285, 288
- River swum across by cavalry, Russia 284, 285
- River swum across by infantry, Germany 251, 252
- Road locomotives. (*See* Traction engines.)
- Ross rifle 155, 158–164
- Rottweil powder:
  - Mexico Table C
  - Spain Table C
  - Turkey 190
- Roumeli-Kavak. (*See* Bosphorus fortifications.)
- Roumania:
  - Carrier pigeons 240
  - Cartridges carried by soldiers 217
  - Powder Table C
  - Rifle Table C
- Rovno headquarters, Russia 42
- Royal bodyguard. (*See* Bodyguard.)
- Royal carbineers. (*See* Carbineers.)
- Rum for South Africa, Great Britain 269
- Russia:
  - Ammunition column 217
  - Ammunition of artillery, how replenished 217
  - Ammunition parks 214, 217
  - Ammunition supply in field 214, 215, 216, 217
  - Army strength and composition 41
  - Artillery ammunition, how replenished 217
  - Ballooning, training of officers in 278
  - Bicycle stretcher for sanitary troops 278, 279
  - Budget 40
  - Cadet corps 280, 281
  - Cadet corps preparatory schools 278, 280, 281
  - Camps of instruction 286
  - Canteens and stores, instructions 294
  - Carrier pigeons 240
  - Cartridges carried by soldiers 214, 217
  - Cartridges in company wagons 214
  - Cavalry crossing a river by swimming, 284–286
  - Chase at Postavy 283, 284
  - Company ammunition wagons 214, 215, 216

Page.

- Russia—Consinued.
  - Distribution of army corps 41–43
  - Districts, military 41–43
  - Fencing (prize) in the cavalry 277, 278
  - Field guns 81, 90, 94, 95
  - Field mortars 82, 95
  - Firing line, how supplied 215, 216, 217
  - Flying parks 217
  - Forts along railway in Eastern China, construction of 282, 283
  - General staff, strength and composition 41
  - Hindustani in the army, study of 281
  - Machine guns 146, 147
  - Maneuvers 402–409
  - Marching maneuvers 286–288
  - Military districts 41–43
  - Mobile parks, ammunition 217
  - Mobilization experiment in the Caucasus 288–293
  - Mouzin rifle Table C
  - Niemen, swum across by cavalry 284–286
  - Opolchenie (territorial reserve), mobilization experiment 288–293
  - Oriental institutions 282
  - Oriental languages in the corps of officers, study of 281, 282
  - Parks, ammunition 217
  - Powders and explosives Table C, 94, 95, 189, 191, 192, 195
  - Preparatory schools 278, 280, 281
  - Revolvers 214
  - Rifle Table C
  - River swum across by cavalry 284–286
  - Strength and composition of the army 41
  - Summer exercises (chases) of cavalry school of St. Petersburg held at Postavy 283, 284
  - Supply of ammunition in action 215, 216, 217
  - Supply of ammunition in the field 214, 215, 216, 217
  - Territorial reserve, mobilization experiment in the Caucasus 288–293
  - Wagons, ammunition 214, 215, 216, 217
  - Winter marches in Siberia 293, 294
- St. Chamond artillery material 110–114
- St. Chamond field guns:
  - Spain 102
  - Sweden 103
- St. Petersburg, headquarters, Russia 41
- St. Petersburg military district, Russia 41
- St. Petersburg military district, cadet corps, Russia 280
- St. Petersburg preparatory school, Russia 281
- Salt for South Africa, Great Britain 269
- Salt ration of a soldier, Mexico 276
- Salvator and Von Dormus machine gun. (*See* Skoda machine gun.)
- Sappers. (*See* Engineer troops.)
- Scientific senate, medical service. (*See* Medical service, scientific senate.)
- Schmidt rifle Table C

Page.

Schneider & Co.'s field guns:
- Boer 109
- Japan 97
- Mexico 97
- Netherlands 96
- Norway 101, 102
- Spain 102
- Sweden 103

School contingent, training of. (*See* Exercises of the school contingent.)

Schools and military education:
- Argentina 55, 56
- Austria-Hungary 6
- Chile 59
- France 12, 241, 249, 250
- Germany 16, 255
- Great Britain 24
- Italy 274
- Norway 39
- Russia 278, 280, 281, 282, 283
- Sweden 80
- Switzerland 50, 51, 52, 53
- Turkey 295, 296

Schools and military education, appropriations:
- Austria-Hungary 5
- Belgium 7
- Denmark 8
- France 10
- Germany 15
- Great Britain 22
- Italy 33
- Netherlands 37
- Norway 38
- Portugal 39
- Russia 40
- Spain 44
- Sweden 47
- Switzerland 48

Schools and military education, artillery:
- France 12
- Switzerland 50, 51, 52

Schools and military education, aspirant reserve officer, Chile 59

Schools and military education, cadet, Russia 278, 280, 281

Schools and military education, cavalry:
- France 12
- Russia 283
- Switzerland 50, 51, 52

Schools and military education, cavalry telegraphers, Germany 254

Schools and military education, engineers:
- France 12, 249
- Switzerland 50, 51, 52

Schools and military education, infantry:
- France 12, 249
- Italy 274
- Switzerland 50, 51, 52

Schools and military education, new military technical school, Germany 255

Page.

Schools and military education, new schools:
- France 249, 250
- Germany 255

Schools and military education, number of pupils, Austria-Hungary 6

Schools and military education, Oriental languages, Russia 281, 282

Schools and military education, personnel:
- Austria-Hungary 6
- France 12
- Great Britain 24
- Norway 39

Schools and military education, preparatory, Russia 278, 280, 281

Schools and military education, regimental infantry schools instituted, France 249

Schools and military education, reserve officers, Chile 59

Schools and military education, riding and shooting school, Sweden 80

Schools and military education, superior war school. (*See* War school.)

Schools and military education, translation of German military works, Turkey 296

Schultze powder 191, 193

Schutterij, Netherlands 60

Schwab powder, Austria-Hungary Table C

Scotte trakteur 219

Scurvy, preventive for 269

Secret expenses, Japan 34

Secretaria del ministro, Argentina 56

Secretary of war. (*See* War department, war minister, or war office.)

Sedd-el-Bahr. (*See* Dardanelles fortifications.)

Servia:
- Army organization 68
- Great general staff 69, 70, 71
- Military law 68
- Rifle Table C

Service, length of. (*See* Length of service.)

Service, military. (*See* Military service.)

Service, obligatory. (*See* Military service, obligatory.)

Seven-and-a-half-centimeter field gun:
- Argentina 96
- Boer 109
- Darmancier and Dalzon 110, 111, 112, 118
- France 92
- Japan 97
- Krupp 114, 115, 118
- Mexico 97
- Spain 102
- Sweden 103, 104
- Switzerland 105, 106, 118

Seven-and-a-half-centimeter mountain gun:
- Darmancier and Dalzon 113, 118
- Krupp 117, 118

Seven-and-seven-tenth-centimeter field gun, Germany 93

Seven-and-six-tenth-centimeter field gun, Ehrhardt 118

Page.

- Seven-centimeter field gun, Italy 94
- Seven-centimeter mountain gun:
  - Darmancier and Dalzon 113
  - Mexico 98
- Shell:
  - Austria-Hungary 92
  - Boer 109
  - France 92, 93
  - Germany 93
  - Great Britain 94
  - Italy 94
  - Japan 97
  - Mexico 101
  - Russia 94, 95
  - Switzerland 107
- Shields, machine guns. (*See* Machine guns, shields.)
- Ships for transportation to South Africa, Great Britain 270, 271
- Shoe brakes, French field gun 84
- Shooting societies. (*See* Rifle societies.)
- Shrapnel:
  - Argentina 96
  - Austria-Hungary 92
  - France 92, 93
  - Germany 93
  - Great Britain 94
  - Italy 97
  - Japan 97
  - Russia 94, 95
  - Sweden 103
  - Switzerland 107
- Siberian cadet corps, Russia 281
- Siberian Cossacks 68
- Siberian military district, Russia 43
- Sickness, maneuvers, Germany 347, 348
- Sickness, precautions taken against, maneuvers, Germany 347, 348
- Siemirechensk Cossacks, Russia 68
- Signaling:
  - France 327
  - Germany 255, 256, 355
  - Norway 395
- Signaling in maneuvers:
  - France 327
  - Germany 355
  - Norway 395
- Simbirsk cadet corps, Russia 281
- Simferopol headquarters, Russia 42
- Simpson machine rifle, Great Britain 143
- Six-and-three-tenth-inch howitzer, Great Britain 87
- Six-inch gun, Great Britain 87
- Skoda field gun tested in Austria-Hungary 82
- Skoda machine gun, Austria-Hungary 122, 127, 128, 129
- Sleeping bag, Norway 394
- Smokeless powder. (*See* Powders and explosives.)
- Smolensk headquarters, Russia 42
- Soda water for South Africa, Great Britain 269
- Soldiers' homes, administrative personnel, Austria-Hungary 6

Page.

- Soldiers' homes, inmates, Austria-Hungary 6
- Soldier's ration. (*See* Ration of a soldier.)
- Soldiers, tenement discontinued, Sweden 75
- Solenite, Italy Table C, 186, 189, 192
- Sore feet, maneuvers, Germany 348
- Sotnias of territorial reserve, Russia 289
- Soup wagons:
  - Russia 409
  - Switzerland 435
- South Africa:
  - British blockhouse system 259–261
  - Supplies and transports of the English army 269–279
- South African war, expenditures, Great Britain 22
- Southwest Africa (German), machine guns 135
- Southwest African protectorate, appropriation, Germany 15
- Spain:
  - Army strength and composition 45, 46
  - Budget 44
  - Carrier pigeons 240
  - Cartridges carried on soldier 217
  - Field guns 102
  - Powders Table C
  - Rifle Table C
- Spandau automatic pistol 177, 178, 179
- Spanish mules for South Africa, Great Britain 270
- Special expenses. (*See* Extraordinary expenses.)
- Speed of carrier pigeons. (*See* Carrier pigeons, speed.)
- Springfield magazine experimental rifle Table C
- Springfield narrow-gauge railway, South Africa, Great Britain 271
- Spurs, new cavalry equipment, Italy 275
- Squadron commanders, Servia 73
- Staff of the commander of the army, Servia 69, 70
- Staff journeys, Argentina 56
- Staffs, appropriations:
  - Austria-Hungary 5
  - France 10
  - Germany 15
  - Great Britain 22
  - Italy 33
  - Mexico 36
  - Netherlands 37
  - Norway 38
  - Portugal 39
  - Spain 44
  - Sweden 47
- Staffs, strength and composition. (*See* Strength and composition of staffs.)
- Stations, carrier pigeons. (*See* Carrier pigeons, stations.)
- Stavropol district; mobilization experiment, Russia 290
- Steamers for transportation to South Africa, Great Britain 270, 271
- Stores, instructions for, Russia 294

Page.

- Straker traction engines 226, 227, 228, 229, 230
- Strategy and tactics, new tendencies, Germany 256–258
- Stream crossing:
  - France 250, 251
  - Germany 251, 252
  - Russia 288
- Strength and composition of administrative troops (intendance, commissariat, subsistence companies, pay department, etc.):
  - Algeria 13, 14
  - Austria-Hungary 6
  - Belgium 7
  - France 11, 12, 13, 14
  - Germany 17
  - Great Britain 24
  - Italy 34
  - Norway 39
  - Portugal 40
  - Spain 45, 46
  - Sweden 80
  - Switzerland 50
  - Tunis 13, 14
- Strength and composition of army:
  - Austria-Hungary 6
  - Belgium 7
  - Chile 59
  - Denmark 8
  - France 11, 12, 13, 14
  - Germany 17, 18
  - Great Britain and colonies 24, 25, 26, 27, 31, 32, 62, 63
  - India 25
  - Italy 34
  - Japan 35
  - Mexico 36
  - Netherlands 37
  - Norway 38, 39
  - Peru (composition) 64
  - Portugal 40
  - Russia 41
  - Spain 45, 46
  - Sweden 47, 74–80
  - Switzerland 50
- Strength and composition of army service corps:
  - Great Britain 24, 27
  - India 25
- Strength and composition of artillery:
  - Algeria 14
  - Austria-Hungary 6
  - Belgium 7
  - Denmark 8
  - France 14
  - Germany 17
  - Great Britain 24
  - India 25
  - Italy 34
  - Japan 35
  - Mexico 36
  - Netherlands 37
  - Norway 38, 39

Page.

- Strength and composition of artillery—Continued
  - Portugal 40
  - Russia 41
  - Sweden 47, 77, 78, 79
  - Switzerland 50
  - Tunis 14
- Strength and composition of balloon troops:
  - Germany 17
  - Russia 41
- Strength and composition of carbineers, Italy 34
- Strength and composition of cavalry:
  - Algeria 13
  - Austria-Hungary 6
  - Belgium 7
  - Denmark 8
  - France 13
  - Germany 17
  - Great Britain 24
  - India 25
  - Italy 34
  - Japan 35
  - Mexico 36
  - Netherlands 37
  - Norway 38, 39
  - Portugal 40
  - Russia 41
  - Servia 73
  - Spain 45, 46
  - Sweden 47, 76, 77
  - Switzerland 50
- Strength and composition of chaplain service:
  - Austria-Hungary 6
  - Great Britain 24
  - Russia 41
  - Spain 45
  - Sweden 76, 77, 78
- Strength and composition of coast artillery. (*See* Strength and composition of fortress artillery.)
- Strength and composition of colonial troops:
  - Great Britain 25, 27
  - Netherlands 37
- Strength and composition of communication troops (railway, telegraph, transport, etc.):
  - Austria-Hungary 6
  - Germany 17
  - Great Britain 24
  - Italy 34
  - Japan 35
  - Mexico 36
  - Netherlands 37
  - Russia 41
  - Sweden 80
- Strength and composition of engineer corps and troops:
  - Belgium 7
  - Denmark 8
  - France 14

Page.

Strength and composition of engineer corps and troops—Continued.
- Great Britain ... 24
- India ... 25
- Italy ... 34
- Japan ... 35
- Mexico ... 36
- Netherlands ... 37
- Norway ... 38, 39
- Portugal ... 40
- Russia ... 41
- Spain ... 45, 46
- Sweden ... 47, 79, 80
- Switzerland ... 50

Strength and composition of field artillery:
- Austria-Hungary ... 6
- Denmark ... 8
- Germany ... 17
- Great Britain ... 24
- India ... 25
- Italy ... 34
- Japan ... 35
- Mexico ... 36
- Netherlands ... 37
- Norway ... 38
- Portugal ... 40
- Russia ... 41
- Spain ... 45, 46
- Sweden ... 77, 78

Strength and composition of foot artillery. (*See* Strength and composition of fortress artillery.)

Strength and composition of fortress artillery (foot artillery, garrison artillery, coast artillery, etc.):
- Algeria ... 14
- Austria-Hungary ... 6
- Denmark ... 8
- France ... 14
- Germany ... 17
- Great Britain ... 24, 27
- India ... 25, 27
- Italy ... 34
- Japan ... 35
- Netherlands ... 37
- Norway ... 38
- Portugal ... 40
- Russia ... 41
- Spain ... 46
- Sweden ... 47, 77, 78, 79
- Tunis ... 14

Strength and composition of garrison artillery. (*See* Strength and composition of fortress artillery.)

Strength and composition of gendarmerie:
- France ... 11
- Japan ... 35
- Mexico ... 36
- Russia ... 41

Strength and composition of general staff:
- Austria-Hungary ... 6
- Bavaria ... 18

Page.

Strength and composition of general staff—Continued.
- Belgium ... 7
- Denmark ... 9
- France ... 11
- Germany ... 17, 18
- Great Britain ... 23, 24
- Italy ... 34
- Mexico ... 36
- Netherlands ... 37
- Norway ... 39
- Portugal ... 40
- Prussia ... 17
- Russia ... 41
- Saxony ... 18
- Servia ... 79
- Spain ... 46
- Sweden ... 47, 75
- Wurttemberg ... 18

Strength and composition of horse artillery:
- Austria-Hungary ... 6
- France ... 14
- Great Britain ... 24, 27
- India ... 25
- Italy ... 34
- Mexico ... 36
- Netherlands ... 37
- Portugal ... 40
- Russia ... 41

Strength and composition of infantry:
- Algeria ... 13, 14
- Austria-Hungary ... 6
- Belgium ... 7
- Denmark ... 8
- France ... 13, 14
- Germany ... 17
- Great Britain ... 24
- India ... 25
- Italy ... 34
- Japan ... 35
- Mexico ... 36
- Netherlands ... 37
- Norway ... 38, 39
- Portugal ... 40
- Russia ... 41
- Servia ... 73
- Spain ... 45, 46
- Sweden ... 47, 75, 76
- Switzerland ... 49, 50
- Tunis ... 13, 14

Strength and composition of intendance service. (*See* Strength and composition of administrative troops.)

Strength and composition of machine-gun troops. (*See* Machine-gun troops.)

Strength and composition of medical corps and sanitary troops:
- Algeria ... 12
- Austria-Hungary ... 6
- Belgium ... 7
- France ... 12
- Germany ... 17

Page.

Strength and composition of medical corps and sanitary troops—Continued.
- Great Britain 24
- India 25
- Italy 34
- Mexico 36
- Norway 38, 39
- Portugal 40
- Russia 41
- Spain 45, 46
- Sweden 80
- Switzerland 50
- Tunis 12

Strength and composition of military justice service:
- Austria-Hungary 6
- Italy 34

Strength and composition of militia, reserve, landwehr, territorial troops, etc.:
- Denmark 8
- Great Britain and colonies 24, 25, 62, 63
- Norway 38, 39
- Russia 41
- Spain 45, 46
- Switzerland 50

Strength and composition of mountain artillery:
- Austria-Hungary 6
- France 14
- Great Britain 24
- India 25
- Italy 34
- Japan 35
- Mexico 36
- Norway 38
- Portugal 40
- Russia 41
- Spain 44

Strength and composition of mounted rifles, Germany 16

Strength and composition of pioneers:
- Austria-Hungary 6
- Germany 17

Strength and composition of railway troops. (*See* Strength and composition of communication troops.)

Strength and composition of reserve. (*See* Strength and composition of militia, reserve, landwehr, territorial troops, etc.)

Strength and composition of rifles:
- Austria-Hungary 6
- Germany 17

Strength and composition of sappers. (*See* Strength and composition of engineer corps and engineer troops.)

Strength and composition of staffs:
- Algeria 11, 12
- Austria-Hungary 6
- Belgium 7
- Denmark 8, 9
- France 11, 12
- Germany 17, 19

Page.

Strength and composition of staffs—Continued.
- Great Britain 23, 24
- Italy 34
- Mexico 36
- Netherlands 37
- Norway 38, 39
- Portugal 40
- Russia 41
- Spain 45, 46
- Sweden 47, 75, 76, 77, 78
- Switzerland 50
- Tunis 11, 12

Strength and composition of telegraph troops. (*See* Strength and composition of communication troops.)

Strength and composition of the train:
- Algeria 14
- Austria-Hungary 6
- France 14
- Germany 17
- Japan 35
- Mexico (transport service) 36
- Norway 39
- Portugal 40
- Spain 45
- Sweden 47, 80
- Tunis 14

Strength and composition of veterinary corps:
- Algeria 12
- Austria-Hungary 6
- France 12
- Germany 17
- Great Britain 24
- Mexico 36
- Norway 39
- Sweden 80
- Tunis 12

Strength and composition of war department, war ministry, or war office:
- Austria-Hungary 6
- Great Britain 266–269

Study. (*See* Schools and military education.)

Study of Hindustani. (*See* Hindustani course for officers.)

Subaltern officers, promotions. (*See* Promotions of officers.)

Subsidies to shooting societies, Switzerland 48

Subsistence (provisions, rationing, etc.), Great Britain 269, 270

Subsistence (provisions, rationing, etc.) appropriations:
- Algeria 10
- Austrian-Hungary 5
- Belgium 7
- Denmark 8
- France 10
- Germany 15
- Great Britain 22
- Italy 33

Page.
Subsistence (provisions, rationing, etc.) appropriations—Continued.
  Japan 34
  Norway 38
  Portugal 39
  Russia 40
  Spain 44
  Sweden 47
  Tunis 10
Subsistence (provisions, rationing, etc.) for South Africa, Great Britain 269, 270
Subsistence (provisions, rationing, etc.) maneuvers:
  France 324
  Germany 349, 350
  Russia 409
  Switzerland 411, 435
Subsistence, reserve men, Servia 72
Sugar for South Africa, Great Britain 269
Sugar ration of a soldier, Mexico 276
Sumatra, carrier pigeons 239
Summer exercises of officers, cavalry school of St. Petersburg, Russia 283
Sumy cadet corps, Russia 280
Superannuation allowance. (*See* Pensions and allowances, appropriations for.)
Superior command of the army, Servia 68
Superior command of the army, staff of the commander. (*See* Staff of the commander of the army.)
Superior war school. (*See* War school.)
Supernumeraries, mobilization, Peru 64
Supper ration of a soldier, Mexico 276
Supplies and transports of the British army in South Africa 269–272
Supply of ammunition in action. (*See* Ammunition supply in action.)
Supply of ammunition in the field. (*See* Ammunition supply in the field.)
Surgeons. (*See* Medical service.)
Surgeons, appropriations. (*See* Medical service, appropriations.)
Survey. (*See* Geographical service.)
Swallows, experiments with 232
Sweden:
  Army strength and composition 47
  Budget 47
  Carrier pigeons 241
  Cartridges carried on soldier 217
  Field guns 103
  Field howitzers 82
  Machine guns 121
  Powders and explosives Table C, 186, 187, 191, 192
  Reorganization of the army 74–80
  Riding and shooting school 80
  Rifle Table C
Swimming across rivers. (*See* Crossing rivers.)
Switzerland:
  Army strength, composition, and organization 49, 50
  Automatic pistols 171

Page.
Switzerland—Continued.
  Automobiles 219
  Budget 48
  Carrier pigeons 241
  Cartridges carried on soldier 217
  Field guns 105–108
  Field gun, provisional 106
  Machine guns 148–154
  Maneuvers 410–437
  Mechanical transportation 219
  New rifle 169
  Powders and explosives Table C, 195
  Rifles Table C, 168, 169
Syratach. (*See* Bosphorus fortifications.)
Tactics and strategy, new tendencies, Germany 256–258
Tallenwan headquarters, Russia 43
Target practice, appropriation:
  Italy 33
  Russia 40
Tashkent headquarters, Russia 43
Tashkent preparatory cadet school, Russia 281
Tea for South Africa, Great Britain 269
Technical artillery. (*See* Ordnance department.)
Technical board, military, appropriations, Austria-Hungary 5
Telegraph company, Turkey 296
Telegraph field, Germany 355
Telegraph troops. (*See* Communication troops.)
Telegraphers, cavalry school, Germany 254
Telegraphy, military, appropriations, France 10, 11
Telescope for field battery, France 84
Ten-and-a-half-centimeter field gun, Argentina 96
Ten-and-a-half-centimeter field howitzer:
  Darmancier and Dalzon 111
  Germany 86, 93
Tendencies in the German army, new 256–258
Tenement soldiers, Sweden 95
Terek Cossacks 43
Terrain, maneuvers:
  France 301
  Germany 328–331
  Japan 360, 361
  Norway 379, 380
  Russia 402, 403
  Switzerland 413, 414
Territorial headquarters. (*See* Headquarters, territorial and local.)
Territorial reserve, Russia 288–293
Territorial reserve, mobilization experiment, Russia 288–293
Territorial reserve, strength, Russia 289
Three-inch field guns, Great Britain 87, 94
Thiele field gun tested in Austria-Hungary 82
Thornycroft traction engines 219, 222, 223, 225, 228, 229, 230
Tiflis cadet corps, Russia 281
Tiflis headquarters, Russia 43

Page.

- Tinned meat for South Africa, Great Britain 269
- Tobacco for South Africa, Great Britain 269
- Togo protectorate, appropriation, Germany 15
- Topographical department of general staff, appropriations, Denmark. (*See* Geographical institute, military.)
- Topography. (*See* Geographical service.)
- Traction engines:
  - Foden 223, 224, 228, 229, 230
  - Fowler 219
  - Levassor 219
  - Milne 223, 225, 228, 229
  - Panhard 219
  - Peugeot 219
  - Scotte trakteur 219
  - Straker 226, 227, 228, 229, 230
  - Thornycroft 219, 222, 223, 225, 228, 229, 230
- Traction engines in British competitive trials 220–230
- Traction engines in maneuvers:
  - France 219
  - Germany:
    - Fowler 219
    - Scotte trakteur 219
    - Thornycroft 219
  - Switzerland:
    - Levassor 219
    - Panhard 219
    - Peugeot 219
- Traction engines in South Africa 219, 220, 271, 272
- Traction engines, requirements of British war office for 220, 221
- Traction engines, tests:
  - Foden 223, 228, 229, 230
  - Fowler 219
  - Milne 223, 225, 228, 229
  - Scotte trakteur 219
  - Straker 223, 227, 228, 229, 230
  - Thornycroft 223, 225, 228, 229, 230
- Train, ammunition. (*See* Ammunition train.)
- Train, appropriations:
  - Algeria 10
  - Austria-Hungary 5
  - France 10
  - Germany 15
  - Norway 38
  - Sweden 47
  - Tunis 10
- Train, changes in organization, Germany 16
- Train corps, increase of personnel, Sweden 80
- Train depots, personnel, Austria-Hungary 6
- Train, strength and composition. (*See* Strength and composition of the train.)
- Train wagons of cavalry, new model, Italy 275
- Training of horses, depot cavalry, Russia 67
- Training of horses, horse tournament, France 246, 247
- Training of infantry, new, Italy 274
- Training of troops. (*See* Exercises.)

Page.

- Transbaikal Cossacks 43
- Transcaspian Cossacks 68
- Translation into Turkish of German military treatises 296
- Transportation appropriations:
  - Algeria 10
  - France 10
  - Germany 15
  - Great Britain 21, 22
  - Japan 34
  - Netherlands 37
  - Russia 40
  - Spain 44
  - Tunis 10
- Transportation, maneuvers. (*See* Maneuvers, transportation.)
- Transportation of men in mobilization:
  - Germany 256
  - Russia 291, 292
- Transportation of supplies to the base and to the field of operations, South Africa, Great Britain 269–272
- Transportation of troops, great general staff section for, Argentina 56
- Transportation of troops to South Africa, Great Britain 21, 270, 271
- Transportation of war material to South Africa, Great Britain 21, 270, 271
- Transportation, railway, South Africa 271
- Transports:
  - France 299
  - Great Britain 21, 270
- Transports for South Africa, Great Britain 21, 270
- Transvaal, rifle Table C
- Traveling. (*See* Transportation.)
- Trials of machine guns. (*See* Machine guns, trials.)
- Trials of traction engines. (*See* Traction engines, trials.)
- Tripod mount, machine guns. (*See* Machine guns, tripod mounts.)
- Troisdorf powder:
  - Chile Table C
  - Germany 187, 193
  - Netherlands Table C
  - Roumania Table C
  - Sweden Table C
- Tromsö defense force, Norway 39
- Troopers of depot cavalry, Russia 67
- Tsetse, South Africa, Great Britain 271
- Turbit, carrier-pigeon variety 232
- Turkestan governorship, appropriation, Russia 40
- Turkestan military district, Russia 43
- Turkey:
  - Carrier pigeons 241
  - Cartridges carried on soldier 217
  - Engineers and fortifications 296
  - Great general staff, admission of officers to 295, 296
  - Obligatory military service for nomadic tribes of Asiatic Turkey 297

Page.

- Turkey—Continued.
  - Powders .... Table C, 190
  - Rifle .... Table C
  - Schools 295, 296
  - Translation of treatises of the German army 296
- Twelve-centimeter field gun, France 93
- Twelve-pounder, Great Britain 87, 94
- Twelve-and-a-half-pounder, Great Britain 87
- Twenty-two-pounder howitzer, Great Britain 88, 94
- Two-and-a-half-inch gun, Great Britain 87
- Uhlans, Austria-Hungary 6
- Umpires, duties of, maneuvers. Norway 395–401
- Unforeseen expenses:
  - Belgium 7
  - Denmark 8
  - Switzerland 48
- Uniforms:
  - France 323, 324
  - Germany 348, 354
  - Japan 374, 375
- Ural Cossacks, Russia 42, 68
- Uralsk, headquarters, Russia 42
- United States:
  - Automatic pistols 171
  - Colt revolver 170
  - Machine guns 154
  - Powders .... Table C
  - Rifles .... Table C
- Usuri Cossacks 43
- Vaksholm garrison, Sweden 74
- Varieties, carrier pigeons. (*See* Carrier pigeons, breeds and varieties.)
- Various expenditures. (*See* Miscellaneous expenditures, appropriations.)
- Vegetable ration of a soldier, Mexico 276
- Vegetables, pressed, for South Africa, Great Britain 269
- Velocity, automatic pistols:
  - Borchardt 170
  - Colt 170
  - Mannlicher 170
  - Mauser 170
  - Parabellum 170
- Velocity, field guns, howitzers, mortars, etc.:
  - Argentina 96
  - Austria-Hungary 92
  - Darmancier and Dalzon 113, 118
  - Ehrhardt 118
  - France 92, 93
  - Germany 93
  - Great Britain 94
  - Italy 94, 95
  - Krupp 118
  - Russia 94, 95
  - Spain 102
  - Sweden 103
  - Switzerland 118
- Veterans:
  - Italy 33
  - Spain 44

Page.

- Veterans' pensions and allowances. (*See* Pensions and allowances.)
- Veterinary corps, strength and composition. (*See* Strength and composition of veterinary corps.)
- Veterinary corps, increase, Sweden 80
- Veterinary service, appropriations, Norway 38
- Vickers-Maxim guns, Spain 102
- Vickers-Maxim 3.7-inch gun. (*See* Pompom machine gun.)
- Vickers R. C. automatic machine gun 154
- Vilna headquarters, Russia 42
- Vilna military district, Russia 42
- Vilna military district, cadet corps, Russia 280
- Vinnitza headquarters, Russia 42
- Vitebsk, headquarters, Russia 42
- Vladikavkaz headquarters, Russia 43
- Vladimir cadet corps, Russia 280
- Vladivostok headquarters, Russia 43
- Vladivostok Oriental institute, Russia 282
- Volsk school (military) Russia 281
- Volunteers:
  - Great Britain 20, 22, 63
  - Peru 64
- Volunteers, officer volunteers, etc., attached to organizations, Sweden 77
- Voronezh cadet corps, Russia 280
- Wagons, ammunition. (*See* Ammunition wagons and carts.)
- Wagons, cavalry, new model, Italy 275
- Wagons, field artillery:
  - Austria-Hungary 92
  - France 92, 93
  - Germany 93
  - Great Britain 94
  - Italy 94
  - Russia 94, 95
  - Spain 102
- Wagons for transportation of supplies in South Africa, Great Britain 271, 272
- Wagons, lack of, South Africa, Great Britain 271, 272
- Wagons, number of, South Africa, Great Britain 272
- Wagons, train, Italy 275
- War department, war ministry, or war officer:
  - Argentina 55, 56
  - Great Britain 266–269
  - Netherlands 60
- War department, war ministry, or war office, administration, new order in council, Great Britain 266–269
- War department, war ministry, or war office, appropriations:
  - Austria-Hungary 5
  - Belgium 7
  - Denmark 8
  - France 10
  - Germany 15
  - Great Britain 22
  - Italy 33

Page.

War department, war ministry, or war office, appropriations—Continued.
- Japan 34
- Mexico 36
- Netherlands 37
- Norway 38
- Portugal 39
- Russia 40
- Spain 44
- Switzerland 48

War department, war ministry, or war office, personnel. (*See* Strength and composition of war department, war ministry, or war office.)

War department, war ministry, or war office, reorganization, Argentina 56

War dogs, Great Britain 265

War expenditures:
- Germany 15
- Great Britain 22
- Japan 35
- Mexico 36

War material, appropriations:
- Denmark 8
- Switzerland 48

War ministry:
- Argentina 56
- Servia 69

War ministry. (*See* War department, war ministry, or war office.)

War office. (*See* War department, war ministry, or war office.)

War school (general-staff school, general-staff academy, etc.):
- Argentina 56
- Norway 38
- Turkey 295

War service, appropriations. (*See* War expenditures.)

Warlike stores, appropriations, Great Britain 22

Warsaw cadet corps, Russia 280

Warsaw headquarters, Russia 42

Warsaw military district, Russia 42

Page.

War ships, maneuvers:
- France 299
- Germany 331

Water cart, Great Britain 265

Weight, equipment, cavalry, Germany 351

Weight, equipment, infantry:
- Germany 252
- Switzerland 411

Weight, field guns, carriages, caissons, limbers, etc.:
- Argentina 96
- Austria-Hungary 92
- Darmancier and Dalzon 118
- Ehrhardt 118
- France 92, 93
- Germany 93
- Great Britain 94
- Italy 94
- Krupp 118
- Russia 94, 95
- Spain 102
- Sweden 103
- Switzerland 118

West Siberian Cossacks, Russia 68

Wetteren powder:
- Belgium ..... Table C
- Denmark ..... Table C

Whisky for South Africa, Great Britain 269

Whites forming the cadre of a troop of Kaffirs, status of, Great Britain 261

Widows' allowances, Germany 15

Winter exercises of Alpine troops, Italy 274

Winter marches in Siberia, Russia 293, 294

Wireless telegraphy in maneuvers:
- France 327
- Germany 354, 355

Wounded, marking of, in maneuvers, Norway 402

Wounds in Chinese war, a surgeon's observations 244

Yarn for South Africa, Great Britain 269

Yaroslav cadet corps, Russia 280

Yeomanry, Great Britain 20, 22, 62, 63

Stanford University Libraries

3 6105 127 306 509